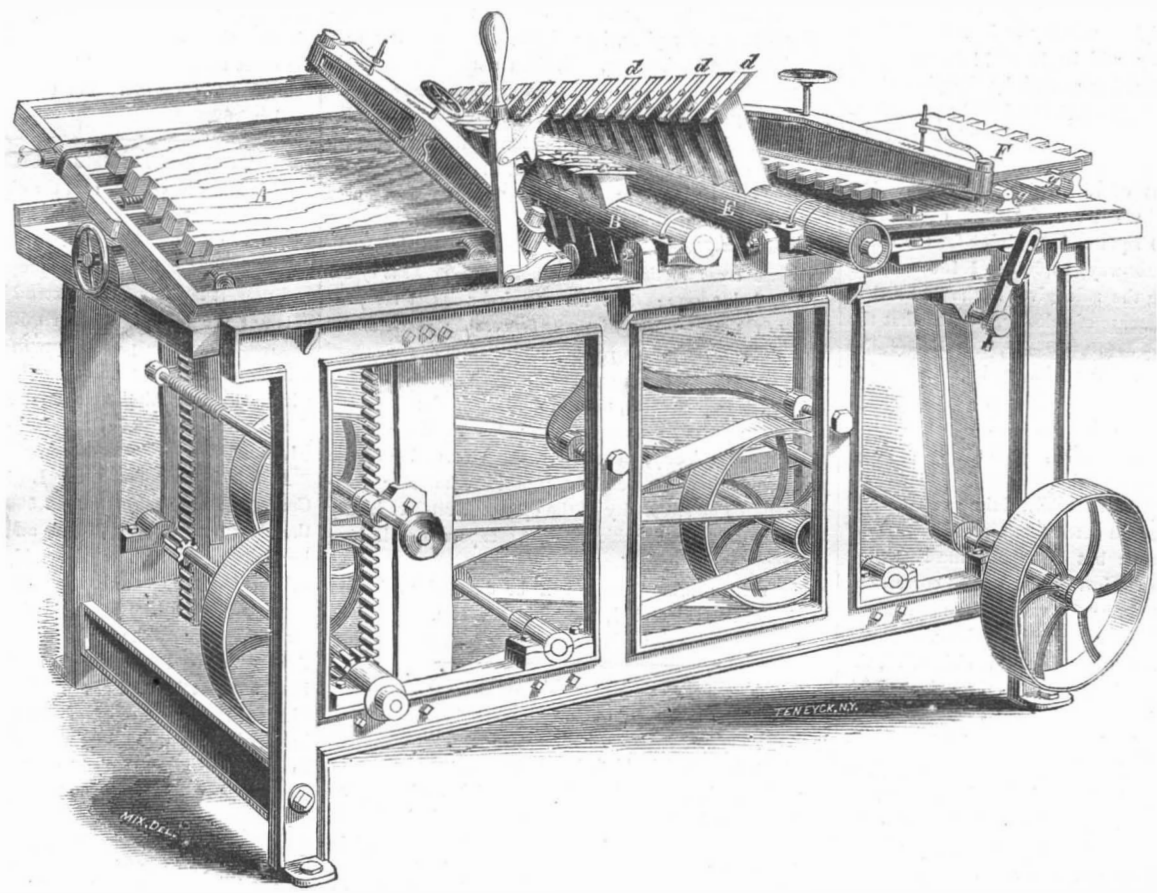
Scientific American.

A JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, AGRICULTURE, CHEMISTRY, AND MANUFACTURES.

VOL. II.—No. 13. NEW YORK, MARCH 24, 1860. NEW SERIES.

IMPROVED DOVETAILING MACHINE.

We here present an illustration of one of those machines for working wood, which, including the Woodworth planer and all the other important improvements in this department, have probably accomplished more labor and contributed more to develop the resources of the country than any other class of inventions. This dovetailing machine, though, of course, of immensely less importance than the planer, is still among the most valuable machines of its class, and it is interesting to all mechanicians from the simplicity of its parts and the perfection of its operation. The dovetailing of furniture and boxes by hand is a slow process, requiring the attention of skilled and careful workmen, but it is performed by this machine with all the accuracy characteristic of machine work and with a rapidity perfectly surprising.



BURLEY'S IMPROVED DOVETAILING MACHINE.

In dovetailing, two kinds of notches or grooves must be cut, those in one board expanding from one side of the board to the other, while in the board which matches these the notches must expand from the end of the board inward. A represents a board placed in position to cut the grooves expanding from its upper to its lower side, the series of cutters, *c c*, being secured to the rapidly revolving shaft, B. The board, A, is placed upon a frame inclined at the desired angle and slowly fed upward past the revolving cutters which form one half of the groove, the inclination of the board causing the outer edge of the groove to have the proper angle. When the board has been carried upward past the cutters, the feed motion is automatically thrown out of gear and the board, with the frame, drops back again below the cutters, at the same time being tipped at an equal angle in the opposite direction; when the feed, resuming its action, carries the board and frame again upward past the cutters, which take out the other half of the grooves, giving their sides an inclination in the opposite direction to the inclination of the sides first formed, so that the grooves expand downward in the proper shape.

For forming the second class of grooves, or those which expand from the end of the board inward, the cutters, *d d d*, are rigidly secured upon the revolving shaft, E, the lengths of the arms which carry them being gradually increased from one end of the shaft to the other, so that the cutters may run in a line diagonal to the frame of the machine. The board, F, is placed upon the machine and automatically fed forward endwise to the cutters, which take out one-half of each groove, when the board is turned over and, by a similar operation, the groove is completed by cutting the other half; the inclined position of the cutters, it will be seen, causing the grooves to expand inward from the end. The board, of course, must be placed upon the frame at an angle in order to bring its end parallel with the line of the cutters. This angle is readily adjusted to correspond with the angle in the grooves of the board, A, by means of the screws, *g g*. The several motions described are effected by well-known mechanical devices.

There are two and perhaps three large fields for the employment of this dovetailing machine. One is in the manufacture of boxes for the army and navy, all of which are required to be dovetailed in order to resist the very rough usage to which they are exposed. A still larger field than this is in cabinet-making, which, in itself, is of inconceivable extent. But the inventor is entirely confident that packing boxes can be made by it at a cost which will enable them to be sold as low as the nailed boxes, and of a strength which will save the considerable expense of hooping. In any event the machine is of immense value, and if it answers well for all the purposes named, it will, in old Dr. Johnson's language, "Confer the potentiality of acquiring wealth beyond the dreams of avarice."

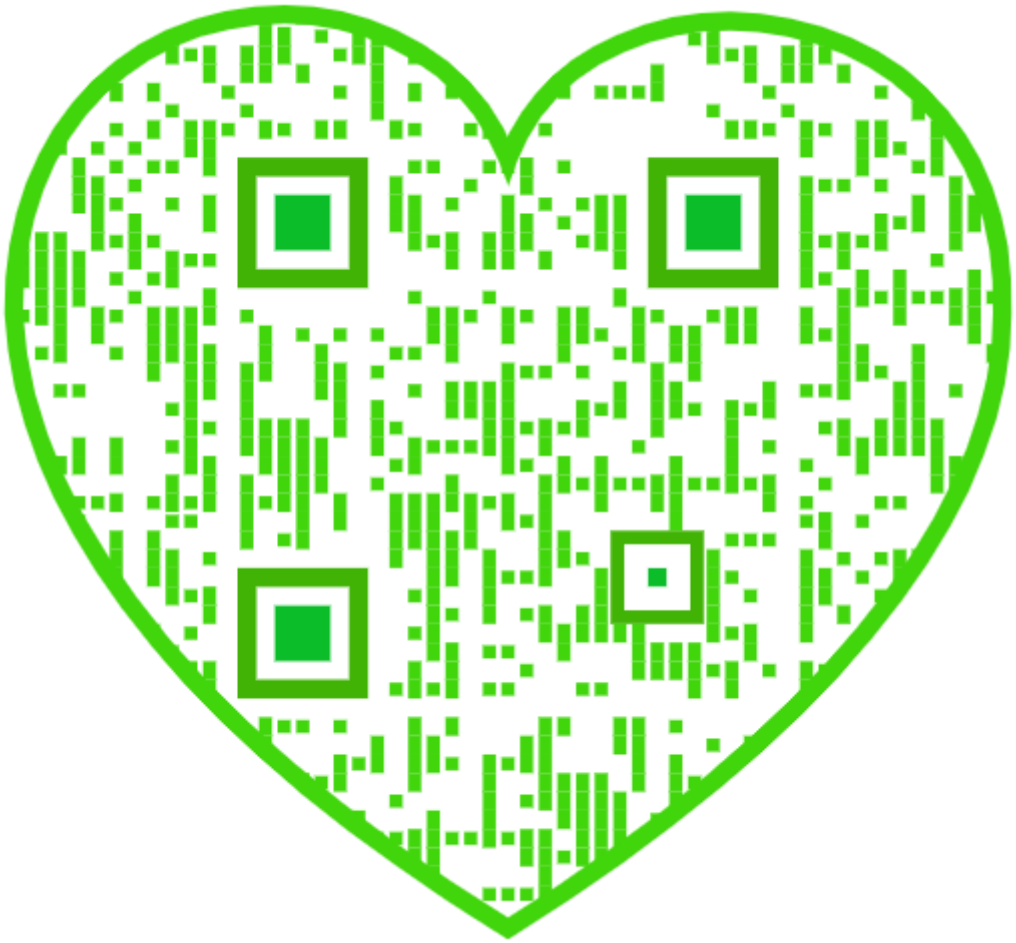
The American patent for this invention was obtained, through the Scientific American Patent Agency, Jan. 3, 1860. Applications for patents are also pending in foreign countries. Further information in relation to the invention may be obtained by addressing the inventor, Thomas H. Burley, at No. 195 Sixth-avenue, this city. A machine may be seen in operation at John Powers' model machine-shop, No. 432 Tenth-street, this city.

MANAGEMENT OF BOILERS.

In the Wolverhampton *Chronicle* Mr. J. Millington, of Tipton, has recently published a letter on the above subject, which deserves general attention. He says:—"I have had experience in the making of steam boilers for half a century, and I have been a maker of boiler plates for thirty years, and I have the happiness to say that hitherto no boiler of our make, unaltered, or made of our plates, has ever exploded, to our knowledge and belief. To prevent all explosion and loss and sacrifice of life, our practice is to use to our own boilers one steam or safety valve of sufficiently large size on every boiler, and one on the main steamway, close to the engine-house door, so that in the case of a sudden stop the engineer eases the valve at once, as it is likely he cannot go to the fire doors to open them, and most explosions happen from standing still. We have also a steam gage or indicator to each main steamway at the engine; it is a needful guide and a great saver of labor and coal. This indicator can be seen by any of the men at work, and it is not allowed to exceed 50 pounds on the square inch. We have also two floats to every boiler, made of wrought iron, and hollow, which never deceive us; the one is affixed to feed pipe and the other is attached to a whistle, which, in case of short water, is heard all over the works, and is particularly useful at night when the works are on, and it cannot so well be seen. By these any man can tell what is the matter, and see the engineer if needful; by this method all the men can look out for themselves, which is better than throwing all the care and responsibility on one man, although we hold him responsible too. Every person may not think this the best plan. I can only say it works well and safely with us, and we have never any extra trouble arising out of it. We have also one or two blow-cocks to each boiler—one from the top of the water, which we find most important as it effects clearance, and one is attached to the bottom of the boiler, and is used many times daily."

Mr. Millington attributes the majority of explosions to the safety valves being screwed down or weighted to a very great pressure, and in this opinion he is perhaps not very far wrong.

© 1860 SCIENTIFIC AMERICAN, INC.



THE OBSTRUCTION TO THE NAVIGATION OF RIVERS CAUSED BY THE PIERS OF BRIDGES.

BY J. W. SPRAGUE.

In the last number of the SCIENTIFIC AMERICAN, I spoke of the contracted water-way, or the water-way between the piers, as if it differed from the uncontracted water-way, or water-way above the piers, by merely the aggregate cross sections of the submerged portions of the piers and abutments. We are now prepared somewhat to qualify this statement. In order that the water passing between the piers may have greater velocity than the water at the head of the piers, it is necessary that the water should pile itself up above the piers, until the additional head thus produced is sufficient to give to the water the required increase of velocity to carry it between the piers. It is evident, then, that the surface of the water in the uncontracted water-way will be higher than the surface of the water in the contracted water-way. This difference of lever measures the hight of the *remou*, or back-water; we will represent it by *b*. To obtain a more correct value of the contracted water-way we must therefore deduct from the uncontracted water-way, not only the aggregate cross section of the piers up to the water-line, but also the product of the sum of the distances between the piers multiplied by *b*. To illustrate this, suppose a river 1,000 feet wide, and 10 feet deep to have 8 piers, 12½ feet thick, with vertical sides, located in it. Let the velocity of the current be such as to cause the obstruction to produce a *remou* of half a foot. How much will the original velocity be increased? The uncontracted water-way will be $1,000 \times 10 = 10,000$ square feet. The obstruction caused by the piers up to the water-line will be $8 \times 12\frac{1}{2} \times 10 = 1,000$ square feet. The sum of the distances between the piers will be $1,000 - (8 \times 12\frac{1}{2}) = 900$ lineal feet. Multiplying this distance by the hight of *remou* gives $900 \times \frac{1}{2} = 450$ square feet. Hence we have for total obstruction $1,000 + 450 = 1,450$ square feet, giving for the value of the contracted water-way, $10,000 - 1,450 = 8,550$ square feet. Applying the rule given in the first article for determining the increase of velocity, we find that the said increase of velocity $= (10,000 \div 8,550) - 1 = (1,450 \div 8,550) = 17$ per cent. If we had paid no attention to the effect of the *remou* in diminishing the water-way, the result would have been the same as in the first illustration of the preceding number, namely, 1-9th or 11 per cent.

The question that would naturally claim our attention next in order would be the determination of the value of *b*, the hight of the *remou*; but I postpone the discussion of that subject, in order to introduce a second correction, in the method of determining the value of the contracted water-way. This is the last correction to be introduced.

When the channel of any water-way is obstructed, the particles of water, struggling to rush through the contracted portion, interfere somewhat with each other, so that they do not completely fill the diminished water-way, but contract themselves into yet narrower compass. Theory affords no method of calculating the amount of contraction thus produced. It gives us *theoretical* velocities, &c., of effluent water, made upon the supposition that no such contractions or losses of any sort occur, and then advises us to multiply these theoretical results by some corrective co-efficient, to give, practical results. The values of these co-efficients can be determined only by experiment. The values of the co-efficients of contraction cover a very wide range, depending upon the ratio of the sides of the opening to the area of the opening; the shape of the opening, the velocity of the water, &c. In the present case, we can reduce the range of values of this co-efficient, to quite a narrow compass. The bottom of the river bed, not being interfered with, there is no contraction there. Whatever depression takes place at the surface is included in the value of *b*, the hight of the *remou*. The only contraction, then, we have to examine, is that which takes place at the sides of the piers. No bridge would be erected over a river that was navigated at a time when the velocity of the current exceeded seven or eight miles an hour. No bridge over a navigable river, with a current at all rapid, would have the piers less than 150 feet apart. If the line of direction of the piers was parallel to the line of direction of the current (as it always should be), the loss of water-way, due to the "contraction of the fluid vein", would probably lie between the limits of half of one per cent and two per cent of the value of the contracted water-way as already determined. The half of one per cent would correspond to the case where the starling was so shaped as to shed the water most freely. The two per cent would correspond to the case where the upper end of the pier was nearly or quite at right angles to the current. Probably one per cent might be taken as a fair value for cases as they ordinarily present themselves. Hence to determine more accurately the value of the contracted water-way, we must deduct one per cent from the value found according to the preceding directions. To illustrate:—What would be the corrected increase of original velocity in the preceding example, making all allowance for "contraction of the fluid vein?" The value of the contracted water-way there given is 8,550 square feet. Deducting one per cent for contraction, we have for the correct and final value of the contracted water-way 8,465 square feet. Applying the rule given in the first article for determining the increase of velocity, we find that the said increase of velocity $= (10,000 \div 8,465) - 1 = (1,535 \div 8,465) = 18$ per cent. Hence in the present instance the increase of velocity, after making allowance for all circumstances influencing the case, will be 18 per cent of the original velocity. It will be observed that the corrections I have introduced do not affect the rule given in the first article. That rule is correct and general; the corrections merely affected the value of the contracted water-way to be used in connection with the rule.

When arches of short spans are thrown across rivers that are not navigable, and it is desired to obtain the velocity between the piers, in order to determine the amplitude of the back-water, &c., then a much greater allowance than two per cent must be made for the contraction. A greater allowance than two per cent must also be made, where the line of direction of the piers makes an angle with the line of direction of the current.

I conclude the present article by summing up the process for determining the corrected value of the contracted water-way:—*From the uncontracted water-way, deduct the aggregate cross sections of the submerged portions of the piers and abutments; from the remainder deduct the product of the sums of the distances between the piers, multiplied by the hight of the remou; 99 per cent of the second remainder will give the corrected value of the contracted water-way.* This value, used in the italicised rule of the first article, will give as correct a value to the relative increase of velocity, caused by the obstruction of the piers, as can be obtained by any process, however complicated. The simplicity of the operation renders it easy to detect any errors, which might escape notice in long and complicated operations.

My next communication will be devoted to the discussion of the value of *b*, the hight of *remou*.

[To be continued.]

WATER—ITS WEIGHT AND POWER.

In the operations of nature and art, no substance is invested with more interest than water. Without water, no plant, insect, fish, bird, beast or man could exist on our globe. It enters into the composition of every organism, and it also operates as a mechanical agent to drive the sawmill and cotton factory by the action of its gravity; or, in the form of steam, it propels the car and steamship by its expansive force being combined with heat. In commerce, water is the standard of the specific gravity of fluids; when, therefore, we see the specific gravity of alcohol set down at 0.794, and eupione oil at 0.655, it means that water is as 1.000 to each of these in weight; they are much lighter, and from this we learn that it is not owing to the lightness of one fluid as compared with another, that one floats on top and another mixes with water, because alcohol mixes freely with water, but most oils do not. Fluids mix together according to their peculiar natures, not their specific gravities. A cubic foot of water weighs 1,000 ounces, or 62½ lbs. An imperial liquid gallon contains 277.274 cubic inches (the United States liquid or wine gallon contains 231 cubic inches); therefore, a pound of water contains 27.72 cubic inches, and a gallon weighs 10 lbs.; while a cubic foot contains 6¼ gallons. A pipe one inch in diameter and one yard in length contains 28.26 cubic inches of water, which is a little over a pound, but near enough to call a yard of water in a one-inch pipe a pound. A very handy rule in calculating the contents of a water pipe is simply to square the interior diameter in inches, and the answer is in pounds for every yard. Thus: how many pounds of water are there in a pipe four inches in diameter and 30 feet high? Answer: $(30 \div 3) \times 4^2 = 160$ lbs.=16 gallons. These simple rules are valuable to all who convey water in round pipes from springs and other sources; also, for those who convey water in cylindrical draft boxes to water wheels. Water, at one time, was held to be incompressible; and, indeed, for all common purposes it may be so reckoned; but when deprived of its air, it is reduced in bulk 1-890ths by a pressure of 360 lbs.=24 atmospheres—on the square inch. It is this quality of resistance to pressure in water which causes it to be so useful as a means for transmitting power by a hydrostatic press.

Water, in falling, is subject to the same laws of gravitation as other heavy bodies; but as its particles have not the cohesion of solid bodies, it is understood that in speaking of the power of falling water, a continuous stream is meant. We presented a method of calculating the quantity of water flowing through an orifice under a high head on page 128, in which there was an error; the product of feet in velocity being multiplied into the square inches of orifice (which was right), but this was divided by 1,728 inches to obtain the cubic feet, which should not have been done; hence, but a fraction of the amount was obtained. The following is the correct method fully detailed to calculate the quantity flowing out under a 30-foot head from an orifice of 2 feet by 6 inches: $\sqrt{30} \times 5.1 = 27.897$ feet per second, which is 1,673.82 per minute, which amounts to 71.3 horse-power, by using 44,000 as a divisor. A correspondent in Lowell, who will soon furnish us with information on pressure and water-power, gives us the following formula, which brings out nearly the same results: $\sqrt{(64 \times 30)} = 43.8 \times .62 \times 1 = 27.156$ cubic feet per second. He uses the co-efficient of correction, .62.

THE NEW YORK CENTRAL PARK.

This is a great work, and the city will ultimately have to pay a *great bill* for it. The original cost for the ground was nearly $5,000,000, and in addition to this the city has paid $275,000 for State property within its limits; and now it is proposed to extend its dimensions on the north at the cost of another million, making a total of $6,275,000. The plan adopted for the improvement of this land called for an expenditure of $1,188,418—to which the Commissioners added "for contingencies," the liberal sum of $311,582—making a total of $1,500,000, which was to complete the park.

A bill is now before the Legislature from the Park Commissioners, asking for $2,500,000 more to complete the work, and $2,500,000 as an appropriation for keeping it in repairs. The Assembly, by a resolution, has called upon the Commissiones to report the amount already expended by them, and also the estimates to show for what purposes the additional $5,000,000 are wanted. An answer to this resolution has been given, in which it is stated that instead of a million and a half, the expenditures have already reached $1,813,004—over three hundred thousand dollars more than was first estimated to be necessary; that in addition for work already marked out, and which is specified, they will need $2,500,000, Then they want a principal ($2,500,000), the interest of which shall not exceed $150,000 per annum, with which to keep the park in order. Here is a total of $12,775,000. Some persons who can judge pretty correctly of such matters assert that the designs of the Commissioners, if carried fully out, will cost $5,000,000 more, making a total of $18,000,000. The Central Park threatens to become a perfect political whirlpool for sucking in the money.

THE "SCATTERING" OF SHOT GUNS.

MESSRS. EDITORS:—I am a gunsmith, and in our business we experience a great deal of trouble in preventing shot guns from "scattering." Although engaged in the business, I have never known any gunsmith who had a rule for constructing fowling-pieces so as to effect this object with precision and uniformity. Do you know of any rule to effect this? J. F.

[If a shot gun is bored truly—a perfect cylinder of equal diameter from muzzle to breech—and if the shot is of equal size and carefully loaded, the gun will carry very straight. We have heard of shot guns being made with a slightly enlarged breech chamber, for the purpose of slightly *drawing* the shot, when discharged, towards the center; but we do not think that any positive useful result was thus obtained.—EDS.

© 1860 SCIENTIFIC AMERICAN, INC.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

On Thursday evening, the 8th inst., the usual weekly meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city; the president, C. Mason, in the chair.

MISCELLANEOUS BUSINESS.

Mathematical Theory of the Wedge.—Professor Reuben, of the Cooper Institute, read an elaborate paper on the mathematical theory of the wedge, and setting forth discrepancies on the subject among various authors on mechanical philosophy.

Mr. Seely—The wedge is a modification of the inclined plane, in which the plane moves; whereas, in the inclined plane proper, the plane is stationary; but the mathematical relation of power to weight is the same in both cases. This principle settles every question that can be raised.

Major Serrell considered the subject of altogether too elementary a character to be entertained by the club.

The regular subject—"Adulteration and Sophistication of Food"—was then called up, and there ensued the following

DISCUSSION.

The president remarked on the advantages a chemical laboratory, under the patronage of the institute, would afford in the elucidation of such subjects as that under consideration. This project is now seriously entertained by members of this institute.

Mr. Bruce read an extract from a late newspaper, showing what havoc a certain Dr. Cox had made (in Cincinnati) among liquor-dealers for vending adulterated liquors.

Dr. Stevens—One of the present aspects of our civilization would be amusing to the philosopher, if it were not for the unmitigated dishonesty revealed and the injury to health and life. I allude to the adulterations of food, dietary articles and drinks—to the *bogus* character of almost everything in common use. We not only put bogus money in our pockets, but wear bogus shoes, clothed in bogus cloth, and wear bogus hats. We drink bogus coffee, with Canadian chickory, Ohio peas, or New England beans, for our breakfast; though most persons would prefer Mocha in the morning, peas for their soup, and beans with a juicy piece of well-browned pork for the grand *entree* of dinner. At our corner grocery we can buy coffee from 8c. to 20c. per pound, according to our taste or plethoric condition of our purse, all from the original bag of Java or Laguira. Our puddings, cakes, custards, preserves, &c., &c., are flavored with any desired extract, from lemon or rose to "thousands of flowers," all made by the chemist from fusel oil. With the greatest of care, this product of the still is extracted from Bourbon and Monongahela; but, like a true Proteus, it re-appears in a thousand new forms. We call for strawberry, vanilla, or what you please of the long list of sirups handed you at the soda fountain of a hot summer day; the sirup is as innocent of its name as the botanist of the fruit from which it is made. Fusel oil is the plain English name of the whole catalogue. We can purchase "Canton teas" in the market, where the proportion of genuine tea-plant leaves to the other shrubs and herbs and leaves of the mixture is 1 to 10. We can call for the genuine "Simon Pure," and find that wily John Chinaman has already sipped his breakfast from the first draught of the brain-cheering aroma. Perhaps we shall have palmed off upon us a Water-street mixture of damaged and stale teas, with clover leaves and a wisp of highly flavored article to delude the olfactory organs and swindle the unwary. Do we know how much logwood or Nicaragua wood we purchase with our cayenne pepper? how much meal with our ginger? And with our other spices, how much of spice berries, from which the essential oil has been previously extracted by distillation? Good Yankee white oak acorns are strangely metamorphosed into nutmegs, which otherwise, with care and culture, might have made splendid pasture oaks, and given to our Yankee grandchildren the means of ship-building from native timber. Why should we attempt to sweeten our coffee with the saccharine marble of Westchester or Berkshire? It may add to the weight of the parcel; but its saccharine qualities are not equal to the brand of "W. W. W." or Stuart's "triple refined." Is it right to rob the independent sovereignty of Coney Island, and call the robbery a sale of muscovado sugar? One may be pardoned for smoking a good Long Island *cabbage*, and enjoying in the pleasing illusion that he is indulging in a real Havana: but we submit, with some trembling, if it would not have been better for him, and more conducive to true health, to have eaten the cabbage and omitted the smoking?

In these days of cant and sharp driving of bargains, the satire of the following may not be too cutting:—"John, have you sanded the sugar?" "Yes." "Watered the rum?" "Yes." "Dampened the tobacco?" "Yes." "Mealed the ginger?" "Yes." "Softened the molasses?" "Yes." "*Then come to prayers!*" We sip bogus wines at our dinners, guzzle bogus beer at our saloons; and

> "Become, with Tam, of memory glorious
> O'er all the ills of life victorious"—

on bogus brandy.

Has our pet baby the colic, we send to the apothecary for a little peppermint; we administer it, and also a little *spirits of turpentine*, which being good for worms, we thus "kill two birds with one shot," supposing, always, that we save our pet. When succumbing to the "ills that flesh is heir to," we take bogus medicines, leaving bogus bills for executors to pay. We are borne in a bogus coffin to the last embrace of honest Mother Earth, no more to be deluded with bogus friends.

Mr. Butler—Cannot scientific men give us tests of the adulteration of food so simple that we may apply them in our own families? The test of cost all can understand; when we can constantly buy an article for less than what the genuine can be afforded at, we may look for adulteration. A few days ago I saw some tea which would immediately stain a polished knife; was the fact evidence of fraud?

Mr. Fisher—A short time ago, I proposed to the editor of a paper that he should employ a chemist to examine articles of commerce, and then publish the names of dishonest manufacturers and dealers. He replied that he had on hand three libel suits for publishing the names of delinquent subscribers, and that he did not care about enlarging his business in that direction. Mr. Fisher, however, favored the project of a laboratory connected with the institute. He believed it might be so conducted that its decisions should be above suspicion of unfairness and prove of the greatest service to the people.

Mr. Dibben—Many bakers, by mixing with wheat flour, maize, potatoes, rye flour, &c., which have the property of retaining moisture, are able to sell a loaf of greater weight than their neighbors for the same money. And I do not hesitate to say that such bakers also sell better bread. Wheat flour may contain more nutritive matter for a given weight than other flour; but the mixture is more palatable and more healthy. In England, flour from horse beans is commonly used and approved, mixed with wheat flour.

Dr. Gould—I believe more harm is produced in New York by diseased meat than by all other unfit food. The beef eaten here has traveled 500 or 1,000 miles, and is slaughtered when a high fever or some worse disease is on. It is a common thing to see, in the rear of a drove of hogs, from two to half a dozen carts to carry the animals which are unable to stand on their feet.

Mr. Worthen (a baker) presented to the club a specimen of the good old-fashioned "rye and Indian" bread. The loaf was raised with yeast, and baked 12 hours. Bakers generally know how to whiten dark flour. A great deal of oil of vitriol is used for that purpose. He had seen bread which would blacken the knife which cuts it.

Dr. Reuben—The flesh of animals killed in a state of fever is unfit for food; they should be slaughtered at the place where they grow, and their carcases be preserved. Meat may be preserved in sealed cans which contain an absorbent of oxygen, or by packing with ice. Such a system would be economical and healthy for all concerned. We need inspectors to see that the people are protected.

The President—We had inspectors of everything a few years ago, but the people needed protection against them more than the articles they inspected. The system did not work well.

Mr. Seely—The statements made by Dr. Stevens are no doubt true; but I do not find in them sufficient reason for apprehension of great evil. Much of what we call "bogus" may be as good as the genuine; men sometimes surpass Nature in fitting things for their especial use. Factitious articles of commerce are always cheaper (often better) than the productions of nature which they imitate; we buy ultra-marine for as many cents per pound as we formerly paid dollars per ounce for Nature's *lapis lazuli*. Factitious liquors may be made less injurious than any produced by the direct processes of fermentation and distillation. A gallon of deodorized alcohol, costing 60 cents, by the addition of a gallon of water and a few harmless articles to please the eye and palate, will make two gallons of better brandy than was ever imported. The fusel oil which all "genuine" liquors contain, is more injurious to health than any of the approved ingredients which are used in the manufacture of adulterated or bogus liquors. Some day physicians and others who lead the fashion about food and drinks will learn these truths, and teach the people to use pure alcohol whenever such stimulant is desirable, instead of prescribing, as now, a far inferior brandy at $8 or $10 a gallon. Factitious liquors, besides being more healthful, may be made more agreeable to the taste. I have been requested to state that saleratus was not such a harmful substance as was represented here a few weeks ago; and for proof of its innocent nature, I was shown healthy men who had been constantly working in it for five years or more. In the factory, it flies about like flour in a mill; the workman breathe it, get it all over their persons and clothes, and yet do not appear to suffer any ill from it. But the explanation is due that we spoke here of the old-fashioned saleratus (carbonate of potash), while the factory I visited made only soda saleratus (carbonate of soda); perhaps this reconciles the disagreement. In Monroe county, I found that people had quite forgotten what they used to call saleratus. The virtue of carbonate of soda in bread-making is the carbonic acid it contains; the bi-carbonate of soda contains twice as much of this as the sub-carbonate (salsoda), both being dry. The carbonic acid is liberated by cream-of-tartar (bi-tartrate of potash), thus introducing potash into the bread. It is easily seen that if sub-carbonate of soda be used for a given amount of carbonic acid required, the quantity of soda and potash left in the bread will be twice as much as when bi-carbonate of soda is used; so that the bread costs more, while it is not so good. The bi-carbonate of soda commonly sold and used does not contain half the virtue its name indicates; much of it is little better than salsoda, a little dried and pulverized; salsoda, crystallized, holds 63 per cent of water, and when dried in the air, 31 per cent. In Europe, instead of cream-of-tartar, tartaric acid is much used. If potash is so deleterious as represented here, we must banish cream-of-tartar, and substitute tartaric or some other innocent acid.

Mr. Fisher—A machine for making bread is being built in Jersey City, which dispenses with yeast and every kind of baking powder. The flour is mixed with salt water charged with carbonic acid at 150 lbs. pressure, in a cast iron cylinder, the whole stirred up and kneaded by revolving knives like a propeller, and when the dough is uniform, a valve is opened at the bottom, it passes out in a constant stream two inches in diameter, immediately expanding to five inches. The dough then only needs to be cut to the proper size, when it is ready for baking.

The President—The subject of discussion is an important one for every man; yet I do not look for any effect on the public of a discussion here or in any other place. Nothing but a general advance of civilization will prevent people buying an inferior article because it is cheaper.

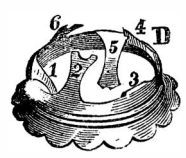
The subject was ordered to be resumed at the next meeting; and Messrs. Fisher, Stetson and Johnson were appointed a committee to give their views on the Patent Laws.

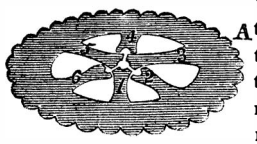
A PERFORATED CASE.—In the composing-room of the SCIENTIFIC AMERICAN, we have had in use for several months, a composing-case (invented by W. A. Hunter, of Bryan, Ohio), the bottom of which is made of zinc, and perforated with small holes to permit the escape of dust. It works well, accomplishing the object for which it is intended, that is, keeping the case clean. We have noticed this case favorably once before; but its continued efficiency prompts us to again recommend its adoption by the professors of "the art preservativ of *all* arts," throughout the country.

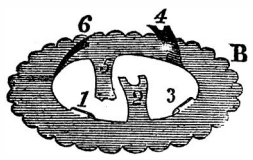
© 1860 SCIENTIFIC AMERICAN, INC.

SHAW'S SHADE-SUPPORTERS OR SHADE CLASPS FOR LAMPS.

This invention consists in certain improvements in the manufacture of the article known as a "lamp shade clasp," by which the manufacturer is enabled to economize both stock and labor in the construction, and produce a cheaper and much more durable article. In the improved construction of supporters, as shown in the annexed drawings, the whole article is formed of one piece of metal. In Fig. D the supporter is struck up into form in dies; the bottom of the cup which is thus formed, instead of being cut entirely out, is stamped out, leaving the portions, 1 2 3 4 5 6, of it attached to the rim. The alternate strips, 1 3 5, are now bent up as shown, forming upper springs, and the other strips, 2 4 6, are bent down, forming lower springs; no riveting being required as in the old style of clasp, and no liability of the dropping-out of springs exists. By an inspection of Fig. A it will be seen that but a small portion of the stock is wasted; whilst the whole labor and time of riveting is saved and a much more substantial article produced. The scollop edge flat clasp, as represented by Fig. B, can be manufactured so as to be sold at a mere trifle above the cost of the sheet metal. The style of clasp represented by Fig. B is preferable to all others, not only in point of cheapness, but as a matter of convenience when it is desirable to remove the paper shade in order to illuminate the apartment. As the paper is not fastened but is merely laid over the clasp, the former can be removed without the slightest trouble, while the clasp can remain on the chimney. These clasps can be made either of common sheet brass or of spring metal. The common sheet brass is decidedly preferable, as it makes an article less liable to break the glass. If made of common brass and a stiff spring is wanted, this is easily accomplished by one or two blows of a die on the springs.







The patent for this invention was issued Dec. 14, 1858, and the clasp has met with approval by those who have used it. The patentee informs us that 27,600 have been manufactured to order and sold to the trade this season. Persons desiring any further information in relation to it will address the inventor, W. F. Shaw, at 174 Washington-street, Boston, Mass.

THE USE OF DIAMONDS FOR MILLSTONES.

MESSRS. EDITORS:—Having noticed remarks and enquiries in several late numbers of the SCIENTIFIC AMERICAN, in relation to dressing millstones with the diamond, I will state that, about a year ago, I purchased two glazier's diamonds, with which we kept three run of millstones in good order for about two months; using the pick only near the eye where heavy dressing was required. We used a straight edge, and cut the stone in lines—fine or coarse—as was required to keep it in good face. The "cracking" done with the diamond cannot be equalled with the pick, as it cuts the stone easily in clean straight lines, without breaking the face of the stone. If great care was used the diamond would probably last a long time, as it does not seem to be injured by the cutting; but in drawing it over a porous stone it is very likely to be broken. This was the case with those I speak of; after which we abandoned their use.

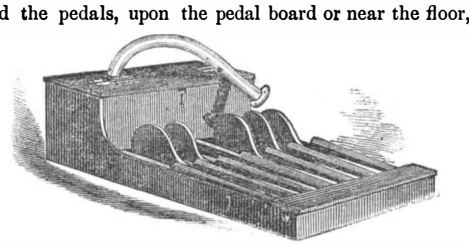
H.

Freeport, Ill., March 15, 1860.

[This subject of dressing millstones has attracted considerable attention of late, and many inquiries have recently been made of us in regard to it. We find, by reference to the patent claims as published on page 257 Vol. XIII. (old series) of the SCIENTIFIC AMERICAN, that Gabriel Natcher, of Indianapolis, Ind., obtained a patent in which he claims the application of the diamond in the production of the small lines in any required form upon the face of a millstone for dressing the same. In the same volume, page 328, illustrations are given of an improved dress, accompanied with remarks upon diamond dressing.—EDS.

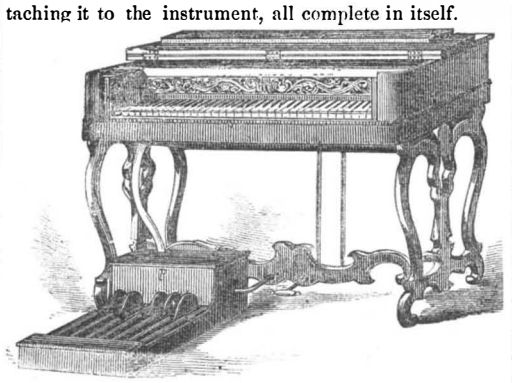
IMPROVED PEDAL BASS FOR MELODEONS.

The annexed cut represents an improvement in the pedal bass for melodeons and Æolian pianos, invented by George W. Lane, and Wm. N. Manning, of Rockport, Mass., the former of whom has sold his interest to E. T. Nichols. The invention consists in arranging the valves, the reeds, and the air chamber of the pedal base of a melodeon or other reed instrument immediately behind the pedals, upon the pedal board or near the floor,



instead of in the case of the instrument, where they are usually placed, thereby dispensing with the long connecting rods and other comparalively complicated mechanism required with the usual arrangement to connect the pedals with the valves, and only requiring in place thereof a simple pipe to connect the air-chamber of the pedal reeds with the bellows of the instrument. This improvement makes a pedal bass which is complete in itself and is portable, and which can be applied in a few minutes to any melodeon, as all that is necessary to effect its attachment is a pipe to connect its air-chamber with the bellows of the instrument.

The small cut represents the sub-bass, which consists of one octave of sub bass reeds, voiced and tuned, with the pedals, action, wind-chest and rubber pipe, for attaching it to the instrument, all complete in itself.



The larger cut represents the sub bass attached to a five octave portable melodeon, which is done by making a three-quarter inch hole in the bellows, and securing thereto the coupling on the pipe; then its position, being on the floor, gives it that full, round, and solid tone so much desired. It can be attached in a very few minutes to any instrument now in use, or any new one about to be purchased.

The patent for this invention was issued Dec. 1, 1857, and persons desiring further information in relation to it will please address Manning & Nichols, Salem, Mass.

A LARGE BREWERY.—One of the largest establishments of the kind in the world is the brewery of Barclay & Perkins, situated in Southwark, London. This brewery was founded by Dr. Johnson's friend, Henry Thrale, who, in 1773 (according to the statement made by the doctor in his "Hebridian Tour"), was paying as much as $100,000 annually to the excise department. After Thrale's death the executor sold it (for $685,000) to Barclay, a descendant of the author of the "Apology of the Quakers," and Perkins, who had been Thrale's chief clerk. Since that time the business has assumed vast proportions, as the following statistics will show:—The buildings cover upwards of 10 acres; two steam engines, equal to 75-horse power, are required to work the machinery; there are 24 malt bins, each equal in size to an ordinary three-story house; and Westminster Hall is not much larger than the great brewing room. More than 100,000 gallons of water are used daily, and 2,000 quarters of malt weekly. Ten brewing coppers have an aggregate capacity of 120,000 gallons; there are four fermenting vessels, each capable of holding 1,500 barrels of beer. The cooling floor has a surface of more than 1,000 square yards; 300 vessels, of 309 gallons each, are used in the working off of the yeast from the beer, which is stored in 150 vats, the longest of which holds 108,000 gallons, and the average gives 30,000 gallons each. Two hundred horses and drays are employed in distributing the beer to London retailers.

THE PURIFICATION OF GOLD.

At a recent meeting of the Chemical Society in London an interesting paper was read on deteriorated gold, by Mr. M. Warrington. He found that a large quantity of gold sent from the Bank of England was singularly deficient in ductility; it was so "rotten" that it could not be rolled or subjected to the usual process of coining. He found by analysis that the specimen contained 92 per cent of gold, 4 per cent of silver, and 2 per cent of tin, and a little proportion of antimony. The presence of the latter metal was supposed to be the cause of the alteration in the usual mechanical character of the gold, and it was no easy matter to extract it economically without loss of the precious metal. After several experiments Mr. Warrington found that oxyd of copper when melted with the gold, in the proportion of about 10 per cent, removed the antimony; the copper parting with its oxyd to the antimony, which then rose to the surface as a powder, and could be cleared off. When, however, this plan was attempted to be carried into operation on a large scale by the metallurgist at the Mint, it was not found to answer, and Mr. Warrington was again applied to. The gold had been melted in the usual black lead or plumbago crucibles, the carbon of which had combined with the oxygen, and thus prevented the proper action of the oxyd of copper on the antimony. On the substitution of clay crucibles for those of black lead, the process was found to be very efficacious, and the difficulty was removed. Mr. Warrington having observed in the course of his paper that there was some difficulty in accounting for the presence of the antimony, one of the members stated that, when at the Australian gold fields, he noticed large quantities of almost pure antimony in veins close to the quartz whence the gold was obtained, therefore there could be but little doubt how the gold became deteriorated. In papers read by other members of the society, they stated, as the result of experiments on a large scale, that gold is to a certain extent volatilized during the progress of cupellation, a small proportion of the metal having been found deposited in the flues of the furnace; and that gold is also, in a slight degree, soluble in pure nitric or nitrous acids. In the course of the discussion, after the reading of these papers, one gentleman mentioned that he was in Australia soon after the introduction of the quartz-crushing machines, when he observed great difference in the amount of the produce of the amalgamated gold on different days; and on examining the "tailings," or refuse of the mill, he perceived a quantity of gold had passed through without amalgamating with the quicksilver. This led him at once to suspect that the surface of the gold was covered with some unctuous substance that obstructed its combination with the mercury, and on treating it with an alkali he found that the metals then readily combined. He consequently recommended the mixture of wood ashes with the powdered quartz, and by that means the daily produce of gold had been equalized and greatly increased. On afterwards subjecting the tailings to the same process, more gold was extracted from the refuse than had been obtained when the powdered quartz was first operated on.

PREVENTING BOILER EXPLOSIONS.

MESSRS. EDITORS:—On page 121 of the present volume of the SCIENTIFIC AMERICAN, you speak of the explosion at the distillery in Williamsburgh. I have no doubt but your remarks are well founded when you say that "under proper laws and a thorough system of inspection, explosions may be completely prevented." As one whose business is constantly in connection with steam boilers, I will now give you my practical experience, having also read the evidence in the daily newspapers of that sad occurrence with much interest. I unhesitatingly say that the frequent displacement of water from one boiler to the other can be prevented by adapting the following plan:—The further ends of the boilers from the fire should be connected near the bottom with a pipe for that express purpose. This is easily done and a sure preventive of explosions from the causes named. Now, as safety in all establishments is a public question of general interest, where two or more boilers are used, this connection should be made. If the above was generally adopted, there would be no danger of explosion from displacement of water.

T. A.

Hudson City, N. J., March 17, 1860.

© 1860 SCIENTIFIC AMERICAN, INC.

ECONOMY OF ANTHRACITE COAL FOR LOCOMOTIVES.

For a number of years past all the heavy transportation on the Philadelphia and Reading Railroad has been performed by engines using anthracite fuel, and they have proved much superior in economy to those of their class burning wood. The chief characteristics of these engines are a large, wide and shallow fire-box; hollow wrought iron tubes for grate bars, through which the water circulates, communicating with the fire-box and the boiler. A variable exhaust is used, but in other respects the engines differ little from ordinary locomotives. The dimensions of the *Black Diamond*, one of the most approved of these engines (as described in the Pottsville *Miner's Journal*), are as follows:—Weight in running order, with fuel and water, 63,700 pounds; 8 drivers, each 43 inches diameter; boiler, 40 inches diameter, and 24 feet 6 inches long from end to end, including fire and smoke boxes; cylinders, 18 by 22 inches; 119 tubes, 2 inches diameter and 14 feet 10 inches long; fire box inside, 65 inches long by 72 inches wide, and 53 inches deep at tube sheet end, sloping to 46 inches deep at fire doors; 16 tubular grate bars, 5 feet 5 inches long and 2 inches outer diameter. This locomotive will haul as her regular load 110 loaded coal cars, weighing, exclusive of engine or double tenders, 910 tuns of 2,000 pounds, at a speed of 8 miles per hour, consuming in the trip of 95 miles, with such a train, about 10,000 pounds of anthracite coal. In this 95 miles is a fall of 620 feet, with several levels, one of which is over 8 miles long. The whole cost of this coal in the tender is $10; while to obtain the same results from an engine burning wood, about 6¾ cords would be required, costing us $26.50 when prepared for use. In addition to this, about 1¼ cents per mile (total, $1,42) are added for extra repairs to the coal-burner.

On this railroad there are also five first-class passenger engines which burn this fuel. The following are the dimensions of the *Hiawatha*, one of the most approved:—Total weight, fuel and water, 56,448 pounds; on her 4 drivers, each 67½ inches diameter, 33,264 pounds; cylinders, 15 by 20 inches; boiler, 40 inches diameter and 21 feet 4 inches long, out to out; 170 tubes, 11 feet 5 inches long and 1¾ inches outer diameter; fire-box, 84 inches long, 42 wide, and 46 inches high at forward end, sloping to 32 inches at fire-doors; 12 fire grate tubes, each 7 feet long, and 2 inches outer diameter; 4 truck wheels, each 30 inches diameter. The *Hiawatha* will take 6 eight-wheeled passenger cars, weighing with their contents 72 tuns of 2,000 pounds, from Pottsville to Philadelphia, 93 miles, at a speed of 30 miles per hour, with a consumption of 2,350 pounds of coal; and uses about 300 pounds more coal, with the same train, on her return trip. Fall between Pottsville and Philadelphia, 559 feet. Whole length of trip (including 23 stops), 4 hours 20 minutes. In performing the same duty a wood-burning locomotive would use from 1¾ to 2 cords of wood, the relative value of each description of fuel being the same as stated of the *Black Diamond*, and the additional cost of repairs, about one cent per mile more than if burning wood. These coal engines were designed and built at the Reading workshops of the company, by Mr. James Mulholland, the master machinist.

With proper management, the same coal fire can be carried without being being raked out or re-made, during a trip of eighteen or more hours; and in an emergency, it is not uncommon for the same engine to turn, and after some cleaning and raking of her fire, perform double duty, or a round trip of 190 miles, with full trains each way.

These locomotives haul trains of unusual length and weight, both of passenger and freight, at the allotted time table speeds, and can stand with the same fire for hours together in case of accident, ready to resume their trips when required.

WHITE ENAMELED CAST IRON WARE.

The latest information from the iron works on the Hartz says that the white enamel in cast iron vessels used at that place is prepared from artificial sulphate of baryta, without any addition of tin or lead. This is a great improvement on those valuable utensils for household use; not only because the objection to the poisonous metal (lead) is removed, but also because the baryta-enamel is far more durable and unchangeable. The reason for this is a chemical fact, namely, the sulphate of baryta is a compound of one of the strongest acids, and is not decomposed by other acids. Hence, an enamel prepared from it remains unaffected in contact with vinegar, acidulous fruit, and so on, even upon continued boiling; the glossy cover does not become dull and rough, but remains white and perfectly smooth. In this it differs very strongly from a lead enamel. The metallic oxyd is not rendered powerless, as the baryta is, but it can freely follow its chemical affinities. Hence the use of a lead compound for such a purpose is reprehensible, the more so as the enamel, when once attacked and laid open, offers still better points for corrosion to a great variety of substances.

Enameled cast iron kettles for the laboratory and kitchen (in the latter especially for making preserves) have of late years come into very general use. The objection to them, which relates to the poisonous nature of the protecting cover, is now completely removed, or will be when those with lead or tin enamel at present in the market are suffered to be withdrawn. Let every lady of the house take the precaution, when she buys an enameled kettle, to test the enamel by means of some acid—the one nearest at hand will answer. Dip a small piece of cotton or linen in a solution of oxalic, tartaric, or any other acid, and place it on the smooth enamel for 24 hours. If, after that, the spot is ever so little roughened or affected, reject the article. Such kettles, however, will not bear to be handled like one of copper or tin, as the inside is of glass, and once cracked it is unfit for use.—*Druggist's Circular.*

YARBROUGH'S IMPROVEMENT IN DRESSING MILLSTONES.

There are two principal objects to be kept in view in arranging the grooves in dressing millstones; first to make the grooves deep, so that they will not be worn out too readily; and second, to cut them in such relations to each other that the kernel of grain cannot escape before it is completely grouud. The mode in which both these objects are obtained in the invention here illustrated will be understood by examining the cut.

Fig. 1

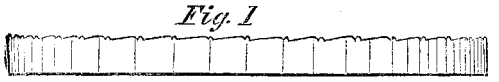
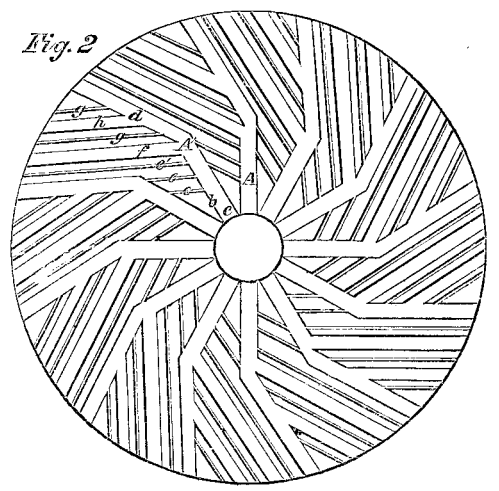


Fig. 2



Twelve large grooves radiate from the hole in the center of the stone, and when they reach half the distance to the periphery are bent at an angle of about 30°, as shown in Fig. 2. These grooves slope downward from the edge, *a*, to the edge, *b*, which latter edge rises perpendicularly, forming the principal cutting edge. From groove, A′, are two two grooves of similar form, *f* and *h*, parallel with the branch, *d*, of groove, A. Small grooves, *e′* and *g g*, of similar form to the large grooves, but shallower, extend from groove, A, parallel with grooves, *f* and *h*, to the circumference of the stone, and two similar grooves, *e e*, parallel with these, connect the grooves, A and A′, with each other. The other twelve grooves, with their branches, are constructed precisely like groove A′, and in the same relation to the next preceeding groove that A′ bears to A.

It is alleged that "by this arrangement of the grooves each kernel is crushed before it passes from the radial to the outer branch of the main grooves; the kernels being spread over the whole surface of the stone by means of the large grooves, *f* and *h*, no part of it is allowed to escape before it is crushed into flour or meal. The small grooves increase the cutting effect of the surfaces, and also prevent a burning of the flour."

The patent for this invention was obtained, through the Scientifie American Patent Agency, Jan. 24, 1860, and persons desiring further information in relation to it will please address the inventor, Joseph Yarbrough, at Milton, N. C.

BELTS FOR DRIVING MACHINERY—WHICH SIDE IS BEST?

This is an important subject, because there is such a vast expenditure incurred annually for belts in driving machinery. The information which we have already published upon it (on page 150 of the present volume of the SCIENTIFIC AMERICAN) and also that which we now publish, is valuable to every mill-owner, and machinist, and will be useful a century hence, because it is derived from experience. It has been stated—and it is pretty generally admitted—that leather belts placed with the *grain* side next the pulleys will carry more power; but in connection with this, another question arises, namely, "which side placed next the pulley is most durable?" The following letter seems to be a pretty conclusive answer to this interrogation.

MESSRS. EDITORS:—On page 150 of the present volume of the SCIENTIFIC AMERICAN, I saw an article on belts and pulleys in driving machinery, and the remarks on the subject, although reasonable and instructive, suggest some comments which I take the liberty of presenting to you. Your Troy correspondent says: "I have found that it makes considerable difference in the power transmitted, according to which side of the belt is placed next to the pulleys. I was one of those who did as my father did before me, and so I run belts with the rougher side next the pulleys, thinking that they would 'hug tighter,' to use a common phrase" &c. Now, there is room for difference of opinion on this point, and my experience (of over twenty years) has taught me some facts. I have run the smooth or hair side next the pulley, but dropped it for the following reasons. Every one knows that the strength of belt leather lies on the hair side, and that also in about one-fourth of the thickness of it, and all know that belts will wear out, and that when about one-fourth is worn, the belt is not worth a straw. I now use the flesh or rough side next to the pulleys, and treat it as follows: I run it free from doing any work, if possible—but it makes but little difference—and give it a good coat of tanner's dubbing on the inside or working side. I repeat this two or three times in as many days, and the pores of the leather, from the effects of the softening influence of the application, become filled, and the inside or rough side becomes as smooth as the outside. The smooth and strongest side of the leather is now preserved, and my experience has taught me that it will last six times longer than by your correspondent's plan. The belt that drives our establishment was originally a 10-inch leather belt, but is now stretched to about nine. The dubbing put on it at first—about three years ago—made it as soft and pliable as I wanted it. It transmitted the power of a 10 by 20-inch engine to its full power, at 70 lbs. to the square inch; the tight or working side of the belt being under, and the slack side on top; a 36-inch iron pulley on the engine driving a 36-inch one on line shaft, the slack side will sag 10 inches, and even one foot if doing full duty, and it never slips; it would pull down the shafting first.

This is my experience of twenty years with belts, and when I have treated my leather in the same manner, the same results have always been secured.

The above-named belt has not been touched except to re-lace it (when broken), for the past three years, and it has been running almost every day since it started.

I would be in favor of putting the smooth surface of belts next the pulleys, were it not that they are much more durable when the strong side is kept from wearing.

T. McG. Jr.

Novelty Works, Dayton, Ohio, March 10, 1860.

In connection with the above subject the following letter forms an appropriate and useful appendix.

MESSRS. EDITORS:—Having noticed in a late number of the SCIENTIFIC AMERICAN (page 150) a very useful table on the power of belts, I send you two very simple and concise rules for finding both the power and the width of belts, which may be useful to many of your readers

Rule 1. To find the power of a belt: The widrh in

© 1860 SCIENTIFIC AMERICAN, INC.

inches, multiplied by the velocity in feet per minute, divided by 1070, equals the power.

Width. Velocity, Horse-power.

Ex. $5 \times 2000 \div 1070 = 9.345$

Rule 2. To find the width of a belt for a certain power: Multiply the nominal power it takes to drive any machine by 1070; then divide the product by the number of revolutions per minute of the driven pulley, and this quotient by the circumference in feet, which equals the width of the belt.

Horse-power. Revolutions. Circum. Width.

Ex. $9.345 \times 1070 \div 1000 \div 2 = 4.999$ or 5 inches.

D. E. C.

Brooklyn, N. Y., March 12, 1860.

JOURNAL OF PATENT LAW.

WINANS' PATENT FOR AN IMPROVEMENT IN CONSTRUCTION OF CARS—PURPOSES AND ADMISSIBILITY OF TESTIMONY OF EXPERTS.

In the case of Winans *versus* the New York and Erie Railroad Company, recently decided in the United States Supreme Court, we find applied the rules regulating the admisibility of "experts." Experts are men whose professional occupation entitles their opinions upon a subject embraced within their particular profession, to greater weight than is given ordinarily to opinions. In almost all patent cases, the testimony of experts becomes necesary. Machinists, chemists, and professional men generally, are summoned to enlighten the minds of the court and the jury. But while they are thus useful and important in their character of experts, they are not allowed to depart from this character, nor will their evidence be permitted when the subject under consideration becomes as apparent to one man as to another. Mr. Winans' patent was for "a new and useful improvement in the construction of cars or carriages intended to travel upon railroads." The specification commenced with an enumeration of the difficulties attending short curves in railroads, from friction, and the consequent necessity of placing the wheels, where four only are used, near together. But in high velocities the shocks from obstructions or inequalities on the rails are thus greatly increased, so that compromise is usually made between the evils consequent on too great a separation and too near approach, the advantage of one is necessarily sacrificed for the sake of others. The incessant vibration felt in traveling on railroad cars is mainly imputed to the minute obstructions which invariably exist, and the approximation of the wheels, necessary to avoid friction, tends to increase the effect of this motion, and its power to derange the machinery of the road. The important object which the plaintiff's invention sought to obtain, as regarded comfort, safety and economy, was to devise a mode of combining the advantages derived from placing the axles at a considerable distance, with those of allowing them to be situated near each other. The specification states the methods used to remedy these difficulties, such as making the truck wheels conical, which, in case of slow traveling, has been found an effectual correction; but in high velocities it causes a serpentine motion, not only on curves, but where the track was straight. To avoid this effect an additional motive is furnished for placing the axles at a considerable distance apart. For this purpose Winans constructs two bearing carriages each with four wheels, to sustain the body of the cars, one at or near each end; the two wheels on either side of these carriages to be placed very near each other. These wheels may be connected by a strong spring, double the usual strength employed for ordinary cars. The use of this spring, though preferable, is not absolutely required, as the end in view may be obtained by constructing the bearing carriages in any of the modes usually practiced, provided the fore and hind wheels of each of the carriages be placed near together; because the closeness of the fore and hind wheels of each bearing carriage, coupled remotely from each other, is considered the most important feature in the invention. On each of the carriages a bolster is placed, on which the body of the car rests, connected with each by a center pin or bolt passing down through them, thus allowing them to swivel or turn upon each other. After this description of the improvement contemplated and the objects to be gained by it, the specification concludes with the following disclaimer and statement of what the patentee claims to have invented:—

"I do not claim as my invention the running of cars and carriages upon eight wheels, this having been previously done; not, however, in the manner or for the purposes herein described, but merely with a view of distributing the weight carried more evenly upon a rail or other road, and for objects distinct in character from those which I have had in view, as hereinbefore set forth. Nor have the wheels, when thus increased in number, been so arranged and connected with each other, either by design or accident, as to accomplish this purpose. What I claim, therefore, as my invention, and for which I ask a patent, is, the before-described manner of arranging and connecting the eight wheels, which constiute the two bearing carriages, with a railroad car, so as to accomplish the ends proposed by the means set forth, or by any others which are analogous, and dependent upon the same principles."

The defendants did not deny that they used cars constructed as described in the patent, but took issue on the originality of the invention, averring, among numerous other matters, that the same, or substantially the same, improvement had been previously made and used on the Quincy Railroad, near Boston.

The cause was brought up from the Circuit Court of the United States for the Northern District of New York. On the trial in the Circuit Court, after the parties had each given evidence tending to prove the issue between them, and the defendants had closed their testimony, the plaintiff's counsel made nine distinct offers of proof (among which was the testimony of experts), which were severally overruled as irrelevant, and exception taken. They then proposed eight several instructions, which they requested the court to give to the jury, and took exception to the court's refusal. Besides all this, the charge was parceled out in fourteen paragraphs, and an exception taken to each. We give the opinion of the Supreme Court, in pronouncing the judgment upon the appeal, so far as concerns the point under consideration; it is as follows:—

(Grier J.) To state each one of these thirty-two propositions at length, and discuss them severally, would be a tedious as well as an unprofitable labor. There was, in fact, but one question by the court, viz: the construction of the patent; the question of novelty being the fact to be passed on by the jury. The testimony of experts, which was rejected, had no relevancy to the facts on which the jury were to pass, but seemed rather to be intended *to instruct on some mechanical facts or principles on which the court needed no instruction*, or to teach them what was the true construction of the patent. Experts may be examined to explain terms of art, and the state of the art at any given time. They may explain to the court and jury the machines, models or drawings exhibited. They may point out the difference or identity of the mechanical devices involved in their construction. The maxim of "*cuique in sua arte credendum*" permits them to be examined to questions of art or science peculiar to their trade or profession; but professors or mechanics cannot be received to prove to the court or jury what is the proper or legal construction of any instrument of writing. A judge may obtain information from them, if he desire it, on matters which he does not clearly comprehend, but cannot be compelled to receive their opinions as matter of evidence. Experience has shown that opposite opinions of persons professing to be experts may be obtained to any amount; and it often occurs that not only many days but even weeks are consumed in cross-examinations, to test the skill or knowledge of such witnesses and the correctness of their opinions, wasting the time and wearying the patience of both court and jury, and perplexing, instead of elucidating, the questions involved in the issue. If the construction given by the court to the specification be correct, and, in fact, the only construction of which it is capable, as we think it is, it would be wholly superfluous to examine experts to teach the court what they could clearly perceive without such information; that the necessity for coned wheels to avoid friction in curves was a consequence of the fact that the wheels were fixed to the axle.

The improvement claimed by the patent being a device to remedy, among other things, the serpentine or wabbling motion of suchwheels inhigh velocities, the testimony offered concerning them, if it would have any effect at all, would tend only to mislead both court and jury from the only issue in the case. The following extract from the charge will show that the judge has given the only construction which the language of the specification will admit, and one which had been previously given by Mr. Chief Justice Taney, and again by Mr. Justice Nelson:—"According to the import and true construction of the plaintiff's patent and specification, he claims to be the first inventor of 'a new and useful improvement in the construction of cars and carriages intended to travel upon railroads,' which improvement consists in *the manner of arranging and connecting* the eight wheels which constitute the two bearing carriages, with a railroad car, the object of which is to make such an adjustment of the wheels, axles and bearings of the car, as shall enable a car with a comparatively long body to pass curves with greater facility and safety, and less friction, and as shall, at the same time, cause the body of the car to pursue a more smooth, even, direct, and safe course over the curvatures and irregularities, and over the straight parts of the road. The manner of such arrangement and connection is to place upon the upper bolster or two bearing carriages, each having four wheels with the flanches of each pair of wheels very near together, the body of a car, so as to rest the weight and have the bearing of the load upon the center or central portion of the bearing carriages; the bolsters of the bearing carriages and car body, respectively, being connected by center pins or bolts, so as to allow them to swivel or turn upon each other, in the manner of a front bolster of a common road wagon, and the bolster being placed at, near, or beyond the ends of the body. And the closeness of the fore and hind wheels of each of the two bearing carriages coupled as remotely from each other as may be desired, or can conveniently be done, for the support of one body, is a most important feature of the invention, with a view to the objects and on the principles set forth in the specification.

"The patentee does not claim to be the inventor of a car body of a new or peculiar construction, in size and form, nor of any single or wholly separate part of the entire car, but he claims as his invention the *manner* of arranging and connecting the eight wheels which constitute the two bearing carriages with a railroad car, in the mode and by the means described in his specification, for the ends before described, whether such railroad car is adapted to the transportation of freight or passengers.

"The leading principle set forth in the specification, upon which the arrangement and connection act to effect the objects aimed at, is, that by the contiguity of the fore and hind wheels of each bearing carriage, and the swiveling motion of the trucks or bearing carriages, the planes of the flanches of the wheels conform more nearly to the line of the rails, and the lateral friction of the flanches on the rails, while entering, passing through, and leaving curves, is thereby diminished; while at the same time, in consequence of the two bearing carriages being arranged and connected with the body of a passenger or burden car, by means of the king bolts or center pins and bolsters, placed as remotely from each other as may be desired or can be conveniently done, and with the weight bearing upon the *central* portion of the bolsters and bearing carriages, the injurious effects of the shocks and concussions received from slight irregularities and imperfections of the track, and other minute disturbing causes, are greatly lessened."

The remarks of the court about the want of a disclaimer, where the patent claimed too much, though correct as a general statement of law, could have little bearing on the present case, where the disclaimer, to be effectual, would include the whole invention claimed. It is abundantly evident, therefore, that the court having given a correct construction of the patent, there could be no error in refusing to admit testimony which, under this construction, was wholly irrelevant to the issue on which the jury were about to pass. The judgment of the Circuit Court is therefore affirmed.

PROCEEDINGS OF THE POLYTECHNIC ASSOCIATION.—This association holds meetings on Thursday evenings in their room at the Cooper Institute, these meetings are open to the public. The reports of the discussions are prepared for the SCIENTIFIC AMERICAN by one of the most learned and competent reporters, and may be relied upon as being correct. We invite the attention of our readers to these discussions, as they will be found not only instructive, but exceedingly interesting.

NOZZLES FOR HOSE PIPES.—Mr. John C. Dickinson, manufacturer of patent nozzles for hose pipes (see page 176, this volume), has removed from Owego, N. Y., to 121 Chambers-street, this city.

© 1860 SCIENTIFIC AMERICAN, INC.

AMERICAN PHOTOGRAPHIC SOCIETY.

[Reported expressly for the Scientific American.]

The society met on Monday, the 12th inst., in room No. 19 Cooper Institute; Professor Draper, president, in the chair.

The minutes of the last meeting were read by Dr. Deck, and were amended by altering the account given of Professor Draper's experiments so as to represent him as saying that "the peroxalate of iron is decomposed by light alone;" the minutes having conveyed the idea that he stated heat to be also requisite. They were then adopted, when Dr. Deck resigned his position to the newly-elected secretary—Charles Wm. Hull, Esq.

G. H. Babcock, Esq., of 5 Tryon-row, this city, and Wm. Swinton, Esq., of Mount Washington Collegiate Institute, were unanimously elected members of the society.

The committee on the collection of specimens of early photographic art reported progress.

It is to be hoped that the profession will feel sufficient interest in the advancement of their art to induce them to forward specimens to the chairman, John Johnson, Esq., East Eighteenth-street.

Communications on science being called for, Robert L. Pell, Esq., read an elaborate and able paper on "Light."

[As this paper is devoted to the same department of photography which we discussed and illustrated in our last number, we omit it in our report.—EDS.]

Mr. Tillman commented upon the emission theory of light as announced in the first part of Mr. Pell's paper. He did not think that it was supported by fact. The undulatory theory accounts more satisfactorily for the general phenomena. In the undulatory theory, a difficulty has been suggested, viz.: that the production of undulations required more mechanical force than was required by the emission theory. A simple experiment settles that point. A man can, with ease, cause undulations in the air which will extend across a lake to a distance of three miles, conveying the sound of his voice distinctly, when he could not emit a current of breath to a distance of 10 feet so as to be felt. Here the indulatory effect is 1,500 times as far as the effect of emission. Recent experiments also seem not to establish the fact that magnetism is produced by the violet rays. Will Dr. Draper be so good as to mention the experiments which he has tried on the degree of temperature required to render bodies luminous?

Dr. Draper—I tried two sets of experiments; one to determine whether all substances became luminous at the same degree, the other to determine what that degree is. The state of incandescence or ignition, in chemistry, means that state when bodies begin to be luminous in the dark without any change of substance, but simply a change of temperature; brick, for instance, or metal heated to a certain degree, emits light without changing its substance.

EXPERIMENTS.

A common gun barrel, with the touch-hole stopped, had several substances—brick, plaster, gold, china, &c., —placed into it, where they were heated, and they were observed through the muzzle, when it was found that all became incandescent at the same instant, therefore, at the same temperature. For liquids, melted metals were employed, and gave the same results as solids; both becoming incandescent at the same temperature.

To determine the temperature, a platinum wire was made incandescent by a voltaic current, and the temperature was measured by a pyrometer. The temperature was then found to be 1,006° Fah. Further, if the temperature was raised gradually, and the effect observed through a prism, the colors of the spectrum made their appearance in the following order, viz.: red, orange, yellow, green, blue, indigo, violet; and when all had appeared, the body was of a white heat, the mixture of the colors producing white light. The photometric results were also remarkable, for, at 1,000°, a body emitted 40 times as much light as at 1,500°. It may also be remarked that all the students of the university and other people who tried the experiment perceived the bodies to become incandescent at the same temperature. There was no peculiarity in different eyes as regards this.

Mr. Seely made some remarks upon the nature of flame, saying that the assertion in books, that flame is gas incandescent or undergoing chemical action, is false, gases without solid matter will not emit light. He observed a whitewashed stove, and thought an unwhitewashed stove became incandescent at a lower temperature than the other.

Mr. Tillman would like to know at what temperature bodies became incandescent in daylight.

Professor Draper—There is a great photometric difficulty in the way of judging of that; for if the amount of light were 64 times as great as that given by the body which would be incandescent in the dark, it would overpower the other so as to have the other unperceived. Beside, the amount of light varies with so many circumstances that any result obtained at one time would be useless for another. As to the nature of flame, it may be stated to be perfectly dark in the central core; then there is a shell of red light; next a shell of orange; then yellow, green, blue, indigo and one of violet. The combination of all these gives a white light. If any particular rays predominate through accidental circumstances, they will determine the color of the light. The general yellow color of common artificial light is produced by accidental circumstances. When a current of air is produced in the center of a flame, there will be found two sets of luminous shells. Beginning at the center, there will be found yellow, then green, blue, indigo, violet; and violet, indigo, blue, green and yellow; the latter being on the outside. Hence, the color of such flames are always blue; there being two sets of blue rings.

Dr. Stevens remarked upon the effect of light on inferior animals, lizzards being altered in color as the season advanced; also, the colors of trout changing with the amount of light they are exposed to. He also mentioned instances which came under his own observation of haloes surrounding persons; and, on one occasion, the horse of a friend. He is able to see well in the dark, and he has observed similar peculiarities with others.

Mr. Tillman referred to Baron Reichenbach's investigation of haloes, as produced by odic force.

Mr. Seely remarked on the photographic process of marking fruit, mentioned in the newspapers. Bayards experimented on the subject in 1830, but he found similar experiments recorded in an old chemistry of 1805.

Professor Draper had often seen subjects in the dissecting-room which, under well-known circumstances, became luminous; and had observed that, by taking a small portion of the luminous matter, another subject could be inoculated with it, and immediately be rendered luminous all over. This was readily explained; but the living body's becoming luminous was not so easily accounted for, if it occurred.

Mr. Seely described the method of measuring high temperature by means of oxy-hydrogen flame diluted with more or less nitrogen.

Mr. Benjamin showed specimens of photographic printing without a negative. On examination, this was found to be neither new nor valuable.

Mr. Campbell commented upon the process described by Mr. Benjamin until he was satisfied of its want of novelty.

Mr. Seely read a letter from Mr. Shadbold, of London, editor of the English *Photographic Journal*, complimenting the society and wishing it success.

Mr. Garvey asked for information on the application of photography to pottery, and whether any gentleman present had tried to impregnate paper by a solution of collodion, by means of hydraulic pressure. These seemed to be things easily effected, and not new.

The section of the by-laws directing the payment of annual dues being read, by way of a hint to members in arrears, the society adjourned to the second Monday in April.

HORSE RAKE PATENT IN CONGRESS.—Some "lobbying" is now going on in Washington for the extension of the patent of Hezekiah Haynes, of Middletown, Vt., which was originally issued on the 18th of June, 1839, and extended for seven years from the end of its first term. The claim of the patentee is having "the teeth of the rake made of wire, secured to the rake head and bent round so as to form a spiral spring." The claim is not for making the teeth of elastic wire, but for attaining greater elasticity by coiling the wire of the teeth around the head of the rake. This patent has been in existence 21 years, and is said to have been remunerative. While its extension by the Commissioner in 1853 was favorably received, the great mass of those who make and use spring teeth rakes, are strongly opposed to its further extension by a special bill.

A COLUMN OF VARIETIES.

The Dental Register of Cincinnati says that the crystal gold made by A. J. Watts of Utica, is better than any other for filling teeth. This is prepared by dissolving gold in *aqua regia* and evaporating the solution when the gold is deposited in crystals. The application of this substance to the filling of teeth was patented through our agency a few years ago.....Louis Jacques Maude Daguerre published his famous discovery of the daguerreotype early in January 1839. He died July 12, 1852. .....The Bessemer process of making steel directly from cast iron has been introduced into Sweeden and France, and great confidence is expressed in its final success and general adoption. Wrought iron is made by this process and cast in forms before it cools.....The great meteor of November 15th, which was seen in this city at 9½ o'clock in the morning (New York time), was seen from Salem, Mass., to Petersburg, Va., and it was *heard* throughout the State of Delaware and the southern portion of New Jersey. In the southern portion of its flight it seemed to come to the earth in a northerly direction..... *The Dental Register* records a case of apparent consumption cured by the removal of decayed teeth, and the substitution of a clean set of false teeth.....The Armstrong gun is made of bars of iron wound spirally in the manner of a stubtwist fowling piece. Three sections are first formed and then welded together at their ends. The riflings consists of 40 grooves about ⅛ of an inch in depth and making one turn spirally in 10 feet 6 inches.....A gentleman in the agricultural division of the Interior Department states that he has tested some tea made from the leaves of the plants grown in the agricultural garden on Missouri-avenue, in Washington. He says the flavor is far superior to any he has ever tried, having a rich, oily taste, which is delightful. The tea to be properly tested, must be drank without milk..... The new tabernacle being built for Mr. Spurgeon is to cost £30,000..... The total gold product of California and Australia up to 1859 was $858,922,000.....A steamship like the *Persia* would be drawn through the water at the rate of 14 knots or 16 miles an hour by a weight of about 25 tuns, suspended over a fixed pulley. The descent of a weight of 30 tuns at the rate of 1,560 feet per minute would give an effect equal to 3,000-horse power, about the full indicated power of the *Persia's* engines.....One of Morrison's steam cranes was recently loaded with 45 cwt., the steam cut off from the boiler, and the load left to hang from the crane by the power of the steam already in the crane cylinder. After hanging for half an hour the weight had decended only four inches.....A body projected into the air, like a bullet from a gun, occupies the same time in its ascent as in its descent to the level from which it started..... The greatest range which can be obtained from a gun is had when the piece is inclined at an angle of 45°..... A canal was once opened, and kept open for many years from the Nile to the Red Sea, a distance of 80 miles .....Forests attract rain, and if a country be denuded of its forests, it is likely to suffer from drought.....From Professor Barlow's experiments on beams, it appeared that the strength of the skin of bars of British cast iron was about 2½ times greater than that of the interior. .....The new material, Adamas, is the result of a prolonged calcination, at a nearly white heat, of silicate of magnesia, as talc, steatite or soapstone, or serpentine. .....In India, the seed sown for wheat crops yields six fold; rice nine fold; and oilseeds, 26 fold.....The sewers of London are about 1,500 miles in length. Some of those in the city are 16 feet in diameter.....A tun of clay will deodorize about three tuns of the solid matter of sewage.....The earliest recorded attempts at fixing images by light are those of Wedgwood and Davy, published in the journal of the Royal Institution of Great Britain, in June, 1802.....A description of all the processes which have been suggested for merely polishing the plate of the daguerreotype would fill a large volume. .....The photographic process, as at present conducted, employs more than 20 different substances.....In the flue plates of our steam boilers internal flanges are turned on the plate for tubes as small as five inches in diameter—a test which only very tough iron would bear. .....In some of our western rivers having rapid currents, a screw propeller ha sbeen fixed in the water and employed in driving mills.....The pumping engine at the Great Wheal Vor has a cylinder 100 inches in diameter.

© 1860 SCIENTIFIC AMERICAN, INC.

DUTCHER'S SELF-ACTING BRAKE.

It seems plain that if a self-acting brake can be made perfectly free from all objections, it must be very far preferable to one which requires the constant care of the driver. The one which we here illustrate is operated by the movement of the pole, back and forth, all the other parts of the carriage preserving their relative position.

The rubbers, *a a*, Fig. 1, are attached to the ends of the levers, *b b*, in such manner that they may rise when the front of the wheels is turned upward, so that they may not interfere with the backing of the carriage, and the levers, *b b*, are operated by the rod, *c*, which is carried forward and connected with the inner ends of the levers *d d*. The outer ends of these levers are attached to the revolving shaft, *e*, which carries the pinions, *i*, upon its end, and is secured by eyes or journals to crossbar, *k*, of the pole. The pinions, *i*, mesh into racks the which are fastened to the forward ends of the hounds, *l l*, and thus prevent the pole from turning independently of the forward wheels, while they permit a horizontal motion of the pole back and forth to the extent of the length of the rack. By this arrangement, it will be seen that when the pole is drawn forward the wheels are relieved of the pressure of the brakes, while, when the wagon runs forward by its own gravity, the brakes are pressed against the wheels through the action of the rod and levers.

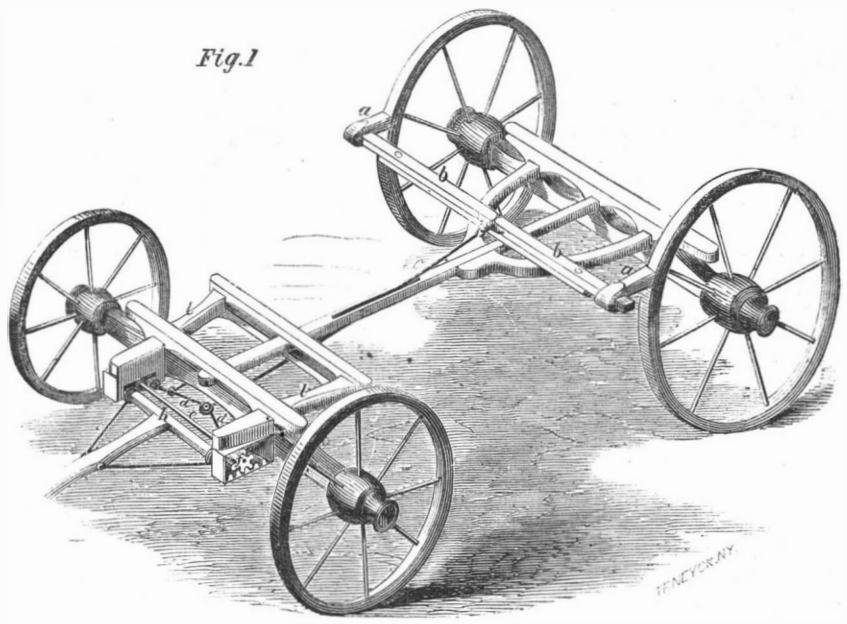


Fig. 1

DUTCHER'S SELF-ACTING BRAKE.

Fig. 2 exhibits the same device applied to a sled, the slots, *q*, being oblique, so that when the pole is drawn forward, the rods, *m m*, are raised, and the shoes or

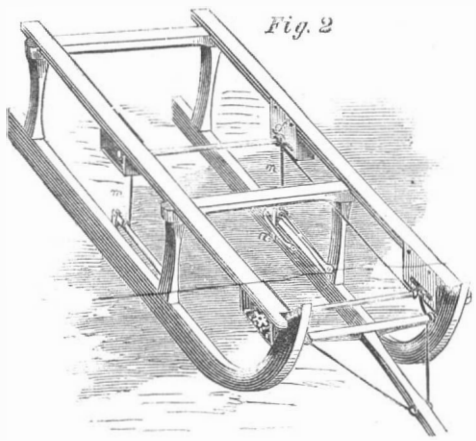


Fig. 2

knives, *h*, are pressed into the ground or snow, thus retarding the motion.

The patent for this simple and apparently convenient automatic brake was secured through the Scientific American Patent Agency, January 24, 1860, and persons desiring further information in relation to it will please address the inventor, Jacob Dutcher, Gibson, Pa.

A SIMPLE APPARATUS FOR ILLUSTRATING THE PRECESSION OF THE EQUINOXES.

A correspondent in the interior of this State writes to us that some "professor" in his neighborhood has discovered that the *precession* of the equinoxes is a "superfluity in science." We infer from this unintelligible phrase, not that it is intended to deny the existence of the phenomenon, but to dispute the propriety of the terms in which it is expressed. We do not suppose it possible for any sane mind, familiar with the observations which prove that the equinoxes are revolving around the ecliptic, to entertain the slighest doubt of the fact, for, certainly there is no truth of science more positively demonstrated; but, as in these days we have all sorts of professors, from those of the manly art of self-defense up to Professor Mapes, it may be that some person so designated has failed to comprehend the problem; this is the more probable as the motion, though simple as a gear wheel, is frequently so clumsily stated as to render it confused. We will suggest to our correspondent, and teachers generally, a simple and cheap apparatus which will render the matter plain to the apprehension of every school-boy, and perhaps even to that of every professor also:—Take a wooden ball of any convenient size, make two points on it directly opposite to each other, to represent the poles of the ecliptic, and draw a line around the globe midway between these points to represent the ecliptic. Cut a narrow groove around each pole at a distance of 23 degrees and 28 minutes (one quarter the distance from the pole to the ecliptic will be sufficiently accurate for illustration). Now enclose the wooden ball with a globe of wire frame-work made of two hoops crossing each other at right angles, with a third hoop encircling these midway between the crossing points. This third hoop will represent the celestial equator, and the points at which the first two hoops cross will represent the poles of the heavens. Pass two small pins, one through each of these poles, into the grooves of the wooden ball, and the wire representing the equator will be seen to cross the ecliptic, these crossing places being the equinoxes. Now take hold of the poles of the wire globe and carry them slowly around the wooden ball, following the grooves, and the equinoxes will be seen to slide along the ecliptic, without changing the angle at which the equator crosses it:—This apparatus illustrates, not only the precession of the equinoxes, but also the revolution of the pole of the heavens about the pole of the ecliptic, just as it occurs in nature. The pole of the heavens is now 1° 33′ from the North Star, and in its slow revolution it will approach nearer this star and then pass away from it, in about 13,000 years approaching within 5° of Lyrae, which will then become the North Star. The precession of the equinoxes is from East to West at the rate of 50 1-10 seconds a year, requiring 25,868 years to complete a single revolution.

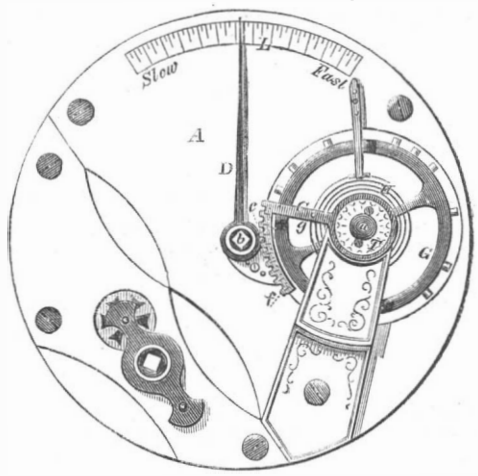
The above-described phenomenon is caused by a wabbling motion of the earth similar to that of a top when its motion has nearly ceased, and the direction of its axis revolves around a point much more slowly than the top turns on its axis. As the apparant durinal revolution of the heavenly bodies is caused by the rotation of the earth in an opposite direction, this revolution appears to take place around those points of the heavens towards which the axes of the earth are directed.

A NEW MODE OF BLEACHING WAX.—In an article published on page 116 of the present volume of the SCIENTIFIC AMERICAN, the common and tedious process of bleaching wax was described, and we stated that some short and safe method of bleaching it was much wanted. From the reading of that article a subscriber in Florida has been induced to send us a sample of white wax which was bleached from yellow by exposure to sunshine for only 20 days. He discovered the method of doing this about five years ago, and he states that his process is short and safe. The sample of wax sent us was bleached three years ago, and is as white as the common Cuban wax.

MERSHON'S WATCH REGULATOR.

There seems to be unusual activity at the present time, among watch and clockmakers, in inventing improvements in the devices for regulating timekeepers. We recently described a new plan for moving the regulator of a watch, and we now present another which is somewhat similar in principle, but with material modifications in the mechanical arrangements.

In the annexed cut, G represents the balance-wheel by the swinging motions of which the rapidity of the watch movements is regulated, and H is the hair spring by which the extent of these oscillations is restrained and determined. This spring, at a short distance from its end, passes through a slit in the pin, *q*, which slit is slightly inclined from the curve of the spring, so as to press the spring with a bending strain, and thus prevent action towards the end beyond the pin, *q*, in effect shortening the acting portion of the spring. Consequently, by sliding the pin, *q*, along the spring, the operating portion of the spring may be varied in length, the effect of which is to vary its strain upon the balance wheel, and thus to change the number of oscillations which the latter makes in a given time, and of course to alter the rate at which the watch runs. For convenience of moving the pin, *q*, along the spring, it is placed in a lever, C, called the regulator, and this regulator has heretofore been made in the form of a delicate index traversing over a graduated arc. But by the invention which we now describe, the regulator is made in two parts, one of which has the geared arc, *f*, upon its end, while the other consists of a long slender index, with a circular hub provided with one or more teeth or pins, which mesh



into the geared arc, *f*. It will be seen that it requires a long movement of the index, D, over the graduated arc, L, in order to effect a very small movement of the pin, *q*, thus rendering possible a much more delicate adjustment of the regulator, which is the object of this invention.

For large movements of the regulator, the index, D, is turned so as to bring its tooth out of gear with the arc, *f*, when the lever, C, can be turned as far as may be desired, and the index, D, again brought back into connection with it.

The inventor of this regulator is Ralph S. Mershon, who assigned it to himself and John M. Harper. The original patent, dated April 26, 1859, was surrendered, and a re-issue obtained Feb. 7, 1860. Persons desiring further information in relation to the matter will please address John M. Harper, importer of watches, at Philadelphia, Pa.

HYDRAULIC ENGINEERING.—The thousands of our readers who are interested in questions appertaining to the motion and force of non-elastic fluids will read, with pleasure and profit, each of the series of articles which we commenced to publish last week (on page 178), written by Jos. W. Sprague, Esq., of Rochester, N. Y.

© 1860 SCIENTIFIC AMERICAN, INC.

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park-row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Two Dollars per annum.—One Dollar in advance, and the remainder in six months.

Single copies of the paper are on sale at the office of publication, and at all the periodical stores in the United States and Canada.

Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.

☞ See Prospectus on last page. No Traveling Agents employed.

VOL. II., No. 13.....[NEW SERIES.]....*Fifteenth Year.*

NEW YORK, SATURDAY, MARCH 24, 1860.

HEALTH OF TRADES AND PROFESSIONS; LABOR-SAVING MACHINERY.

HEALTH of body is the greatest of physical blessings, and the health of the people, in all their various pursuits, is a subject worthy of profound attention at all times, because the energy of communities and their ability to execute mental and physical labor are all dependent upon it. In every civilized country of the present day, the occupations of the people are very various, and the effects of these upon health are as diversified as the vocations. In this country we have no reliable health statistics of trades and professions, but in Europe several works of great value have been compiled for the very purpose of showing how the different pursuits of the people affect their health and longevity; and the last number of the *Edinburgh Review* contains a very able essay on the subject, from which much practical information may be gleaned. As the same influences lead to the same results in all places, an investigation of these leads us to the general conclusions that what we call "our advanced civilization" costs an awful sacrifice of health and life, and that every invention, new machine and labor-saving improvement, is a beneficent instrument for removing evils and ameliorating the condition of those who suffer from following unhealthy callings.

Those men who manufacture bread for the people are required to labor during several hours of the night in an atmosphere which is hot as that of a tropical clime and filled with a floating dust that is inhaled at every breath. Their rate of sickness is dreadful; thirty-one in every hundred spit blood; they do not live half their days, and most of them perish from consumption. We are glad that a machine has been invented for mixing and kneading the flour, and if night labor will be abolished by the substitution of aerated for fermented bread, as noticed on another page in the transactions of the Polytechnic Society, an inestimable boon will be conferred upon humanity. Tailors and milliners furnish a large contingent of young life to the army of death. Their unhealthy positions and their confined apartments produce a great amount of consumption in all cities, while diseases of the eye are fearfully prevalent among them. The average duration of their life is only 36 years, and these years are full of suffering. We refer to what is the effect of a life where hand labor is practiced; for the sewing machine, although considered an innovation when first introduced among us, which was to "rob the needlewomen of their daily bread," has been the means of shortening their hours of labor and improving their health. Those who make our shoes, as well as those who furnish our clothes, are very subject to lung and eye diseases; but sewing machines are proving benefactors to them all.

The compositors who set up the type for the books and papers which convey knowledge and news from mind to mind, are very subject to lung and several other diseases. Jobbing printers, who have a greater variety of motion than those engaged on newspapers, are the most healthy of the two. Those who are connected with morning newspapers, and who labor during night in the glare of flickering gas light and in an atmosphere foul with carbonic acid gas, do not average 34 years. There are at present nine type-setting and six distributing machines at work in this city, and have been for the past three years, and they effect a saving of at least 25 per cent. They are well adapted for bookwork; could they be applied to newspapers, they would prove a great benefit to the printing profession.

The workers in stone and marble in our cities are also very subject to lung diseases by inhaling dust. Their average age is 38 years, and they are very frequently sick. We have known several who had to quit the business in New York on account of threatened consumption, who were otherwise of powerful frames and naturally robust. The walls of our buildings are raised upon the sighs of the artizans who hew the stones; and those who carve monuments for the dead inhale the seeds of disease with every stroke of the chisel that inscribes an epitaph. Those who grind the knives and forks with which we eat our food are very short-lived. The average age of dry grinders is 29 years; a fork grinder of 36 years is a very old man. The dust which is inhaled by the lungs soon coats them with stone. Wet grinding, such as that of saws, axes, knives, is not so unhealthy, but the dry polishing of every tool greatly shortens the lives of those engaged at the business. An exhaust fan to draw off the dry dust should be applied to every emery wheel in factories under a penalty, and all those engaged in these operations should never permit a razor to be drawn across the upper lip.

The miner, who quarries our coal in the dark and damp pit, labors at a most unhealthy and dangerous occupation. We have been informed that many of our mines are not half ventilated, and, as a consequence, the miners breathe in an atmosphere charged with carbonic acid gas. Consumption is very prevalent among them, but this could be obviated in a great measure by superior ventilation. As our coal mines are rapidly developing, we should care much for the health of those men who labor so hard and risk so much to furnish us with fuel for our cheerful fires, to cook our food and drive our steam engines. The best means of ventilating coal mines is a subject worthy of profound consideration by inventors and men of science.

The statistics of trades are conclusive as to the unhealthiness of most of those pursued in confined apartments. Pianoforte-making, card-enameling, looking-glass-silvering, cotton-spinning, flax-dressing, and many other occupations, are very destructive to health. Merchants, lawyers, doctors, clergymen and school teachers are far more healthy than mechanics, except those who work in the open air. An increase of labor-saving machines, so as to shorten the hours of mechanical toil and permit more frequent exercise in the open air for those engaged in trades and professions, would tend greatly to promote the health of the people and increase their longevity.

NATURE CARRYING OFF A DEAD HORSE.

As we came down to our office this morning, we passed the carcass of a horse which the usual neglect of the city had allowed to remain in the street. But Nature, whose laws are invariably executed, and whose forces are never idle, had already commenced the task of bearing away the offensive mass on the wings of the wind, to be transformed into the waving leaves of her forests or the green carpets of her hills. As long as the horse was alive, the substances of which his body was composed were held together by the mysterious force of animal life; but when this force ceased, these elements began to fall asunder, and in doing so they were changed from the solid or liquid to the gaseous state. The oxygen, hydrogen, nitrogen and carbon of which the muscles, nerves, fat, heart, liver, &c., are principally composed, separate at the close of life from their combinations in the animal economy, and enter into new combinations with each other and with the oxygen of the air, by which they become carbonic acid, ammonia and water. The carbonic acid and ammonia instantly expand into invisible gases, the water evaporates, and thus nearly the whole of the ponderous body becomes invisible, and floats away in the atmosphere. In the carcass which we saw, these processes of decomposition and recombination had commenced, and the hide of the animal was distended by the expansion of the imprisoned gases, which were confined by the tight skin as steam is confined by the strength of the boiler.

As two of these gases (carbonic acid and ammonia) are injurious to the human system, they are, by one of the most beautiful provisions of nature, made offensive to our senses; and we are thus warned to avoid their noxious presence. In the air, they come in contact with the leaves of plants, which absorb them and re-convert them into food for animals; they are again devoured and transformed into animal matter; and thus, in the great circle of nature, the organic elements forever run their restless round of change. Were not the arrangements of nature interfered with by man, this re-conversion into living animal matter would be more direct and rapid; multitudes of crows and worms would at once devour the carcass, and thus even the temporary poisoning of the atmosphere would be avoided.

Sextons say that in removing bodies which have been interred for some time, the earth above the coffin is always stained, while that below is not discolored in the least. The stain results from the passage upwards of the gases which are set free by the decomposition of the body. It is a curious reflection that we are all, as is appropriate for the inhabitants of Gotham, finally going to *gas!*

LINSEED OILS.

The quantity of linseed oil imported into this country annually amounts to 257,400 gallons, valued at $164,700. The quantity manufactured at home from native grown seed, we have been unable to ascertain; but from the number of our American oil-works, we judge that it is equal to, if not greater than the foreign import. The wonder to us is that we import a single quart, nay, that we do not export large quantities. American flax seed is superior in its yield of oil to any other in the world; we have the best of soils and climates for raising it, and yet England imports flax seed from India, makes oil from it, and furnishes us with more than a quarter of a million gallons per annum. This should not be; and with the exercise of wisdom and enterprise, we might at least supply our own wants. There are several linseed oil-mills in New York and its vicinity, and as we have no good substitute for this oil, as a paint vehicle, it forms a staple business. This oil possesses the property of absorbing a considerable quantity of oxygen and drying rapidly in the atmosphere; and it is more durable for painting purposes than any other, because it forms a hard and tough coating when it dries.

The mode of manufacturing linseed oil is simple, but consists of several operations. The oil seems to exist in the seed in a mechanical rather than a chemical combination; therefore, by merely reducing the seed to meal pulp, heating it slightly, and then submitting it to severe pressure, the oil is extracted. This is a brief statement of the process, but we will describe the apparatus more minutely, so as to convey more correct ideas of the agencies employed in the operations.

The flax seed is first placed in a hopper situated above two adjustable smooth metal rollers, between which it flows down and is bruised to fit it for the grinding process. The crushed seed is now spread upon a circular bed or track in the inside of a curb, and is run over by two large stones set on edge, and called "edge runners," which operate "Chilian mill" fashion. It is here reduced to the condition of meal possessing a certain fineness; and when pure, cold-drawn linseed oil is desired, it is at once submitted to pressure, but the quantity thus secured is very small. To extract all the oil in the seed, the ground meal is first heated to about 212° Fah. in a steam kettle. This is a vessel surrounded with a jacket having a steam space between, into which the steam is admitted and heats the kettle. The meal is stirred while being subjected to heat, and when it is uniformly raised to 212°, it is forced out by a door at the underside into strong thick bags, about 20 inches in length and 8 in width. These are then placed in a strong iron box, which is lined with thick copper, perforated over its surface, and forming an inner casing with a space between the sides; and it also has a false bottom. When this box is filled up with the bags it is then run in upon a tramway above the plate of a hydrostatic ram, and under the stationary piston common in all hydrostatic presses. It is now subjected to very severe pressure by the pumps, which are usually operated by steam power. As the pressure upon the bags in the box increases, the oil is forced from the meal and passes through the perforations of the copper lining, thence out through a spout into a receiver. When a certain degree of pressure has been arrived at, the meal yields no more oil: then the pumps are stopped, the box gradually descends and is pushed

© 1860 SCIENTIFIC AMERICAN, INC.

out on its tramway, when the compressed bags are removed, each containing an oil-cake. But even after submission to severe hydrostatic pressure some oil is still left in the cakes, and to extract this they are subjected to a second pressure in what is called the "wedge-press." In it the bags are exposed to the pressing action of wedges —inclined planes—driven by heavy stampers of timber, and, for this reason, sometimes called "stamper presses." The cake now left in the bags is used for the food of cattle, and the oil thus obtained is raw linseed. The wedge-presses are also called "Dutch mills"; they are the oldest kind used, and in some oil-mills in England no others are employed. Good flax seed weighs from 48 to 52 lbs. per bushel, and good American seed has yielded as much as 26½ per cent of oil. During the past year its price has been rather low, its average being but 64 cents per gallon. On page 220, Vol. VII. (old series) of the SCIENTIFIC AMERICAN, there is an illustrated description of the patented horizontal oil press of Mr. D. L. Latourette, and since that date W. Wilbur has invented a peculiar roller oil press, principally designed, however, for cotton seed, from which 1,660,000 gallons could be made annually from the usual American crop.

Great complaints have recently been made in regard to the quality of the linseed oil sold for painting purposes, both here and in England. It is said to be greatly adulterated with sunflower and resin oil, neither of which are suitable for painting, because they do not harden in a proper manner and bind the particles of the pigment in a solid and enduring coat. Resin may be added to linseed oil as it will dissolve in it, and the oil thus adulterated will, when cold, apparently dry, but in very warm weather, it becomes soft and sticky. Resin oil, which is a cheap adulterator of linseed, does not dry completely and become permanently hard. It is also injurious to the colors of the paints, because it effloresces and injures the tints of the finer kinds. All adulterations of linseed oil should be reprobated, yet it appears to us that it is scarcely possible to sell the pure article for the prices which have lately been ruling. Those who desire to have their houses treated with durable paint should look well to the quality of the oil used, as the very first requisite in accomplishing their wishes.

Every fixed fluid oil has its own specific gravity, and as linseed is the heaviest, its purity can be determined by testing with an "oilometer." This instrument, however, will afford no clue to the nature of its adulteration. Resin oil can be detected very easily by simply heating a small quantity of it in a cup. The odor of this oil is so peculiar that a very small quantity of it mixed with linseed can thus be smelled by that useful and beautiful instrument of scenting and snuffing called the *nose*. In the hands of practiced chemists and oil merchants, different kinds of oils can be detected by the use of sulphuric acid, but no practical information for common purposes can be given by words on this head; such knowledge can only be acquired by visible examinations. It is greatly to be regretted that linseed oil should be adulterated in the least, as its quality for painting purposes is decidedly injured in proportion to the amount of foreign mixtures in it.

THE NEW YORK ZOOLOGICAL GARDENS.

The Special Committee appointed to methodize a plan for the Zoological and Botanical Garden, prepare a draft of an Act of Incorporation and confer with the Commissioners of the Central Park (this city), have made a full report on the subject, from which we make the following extracts:—

The committee have examined with some care the reports on the Gardens of Kew (England), and of the Zoological Society of London, and an idea may be gathered of the number and variety of the requisite buildings, and the extent of the collections from the following facts:—In the Zoological Gardens there are, besides invertebrates, one thousand three hundred individual specimens of more than six hundred species of vertebrate animals. The structures for the accommodation of these are three aviaries, a crane enclosure, four waterfowl enclosures, the young pheasants' and emeus' enclosures, the zebra and antelope house, three small carnivora houses, the pheasant aviary, alpaca enclosure, the great carnivora, the bear pit, bear pond, camel house, the seal pond, kites' aviary, three eagle aviaries, the small mammalia, raccoons' cage, vulture cage, antelope enclosure, the aquavivarium, the beaver pond, otter cage, the armadillo enclosure, the coypus cage, the monkey house, the porcupine enclosure, dove cote, owls' cage, reptile house, kangaroo enclosure, sheep and goat sheds, parrot house, deer house, elephant house, the wild boars' sties, the brush turkeys' enclosure, the giraffe house, antelope house, two antelope sheds, hippopotamus' houses, and the ostrich house.

In the Gardens of Kew there are two museums of economic botany, the conservatories, the orangery, tropical aquarium, palm house or palm stove, mesembry anthemum, house for the African fig, marigold, orchideous house, double orchideous house, Victoria house for the Victoria regia and other water plants, succulent house, hardy aquarium, the New Zealand and coniferous house, the Australian house, the tropical fern house, the heath house, museum stove, double miscellaneous tropical house, azalea house, temperate fernery, rhododendron and camelia house, propagating house, double propagating house.

The portions of the Gardens at Kew devoted to scientific purposes consist of seventy-five acres.

The Zoological Garden in Regents' Park occupies twenty-six acres, and the Botanical Garden eighteen acres.

The number of visitors at Kew in 1841, was 9,174; in 1850, 179,627, and in 1858, 405,376. At the Zoological Gardens the average number of visitors for the seven years previous to 1847, was 111,500; and for the seven years ending December 31, 1858, 350,620. The receipts of this institution were about $70,000, and the expenses $60,000, leaving a surplus of $10,000.

The committee have been unable to form an exact estimate of the amount requisite to put the garden in order for exhibition; but upon full consultation, the opinion seems general, that the effort should not be made without a capital of two hundred and fifty thousand dollars.

WEEKLY SUMMARY OF INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page:—

RETORT FOR BURNING BONE BLACK.

The object of this invention is to obviate the difficulty hitherto attending the warping of the metal plates which retain in proper position the upper parts of the cast metal chambers or tubes in which the bone black is burned. The invention also has for its object economy in space, the parts of the retort being so arranged that the charged chambers or tubes will be exposed in the most advantageous manner to the fire, and the contents of all the chambers or tubes simultaneously burned. The invention has further for its object the perfect controlling of the fire so that the chambers or tubes may be uniformly heated, and no part of their contents injured by too intense a heat, and so forming the chambers or tubes as to resist the action of the heat, the parts most exposed being thicker than the other parts. The invention has lastly, for its object a more facile mode than usual, of connecting the coolers to the chambers or tubes so that the former may be readily attached to, and detached from the latter, and also in an improved mode of drying the bone black, after it has been used, so that the same may be deprived of the moisture it contains both by evaporation and draining, thereby greatly expediting the drying process, and rapidly preparing the bone black for the chambers or tubes. The credit of this contrivance is due to William Mitchell, of this city.

BRACKET FOR STAGING.

The object of this invention is to enable the workmen to erect a staging with greater ease, and with the same security, than by the present mode; and to secure the brackets, upon which the foot-boards are laid, to a wooden building either before or after plastering, which in the latter instance cannot be done with the present mode of attaching the brackets. The attachments are readily made by one man, and the staging can be removed and the whole taken down with ease and facility. The invention for effecting this, consists in constructing the bracket itself in a peculiar manner, and in the use of a screw having a collar and square-eyed head, which screw is driven into the building at suitable places, and the bracket attched to the same by a wedge key bolt. The inventor of this improvement is T. J. Gifford, of Salem, Mass.

PIANO-FORTE.

This invention consists in the employment either in a horizontal or upright piano-forte, of a bridge or bridges, of a depth equal or nearly equal to the whole depth between the strings and the bottom or back of the case, supporting the strings upon or against a single sounding-board which either constitutes the bottom or back, or is annexed in the extreme lower or rear part of the case. It also consists in the employment, for the purpose of holding the strings at the two bearings or points between which they vibrate, or at either of the said bearings or points, of a metal clamp of novel construction by which they are confined more securely than by the short oblique pins commonly employed for the purpose. This improvement was designed by Spencer B. Driggs, of this city.

RIBBED KNITTING.

This invention consists in a novel mode of applying and arranging a series of sinkers to operate in combination with two series of needles for the production of ribbed knitting. It also consists in a series of elastic plates so applied in combination with the ribbing needles and in relation to the needle plate which contains the principal series of needles, as to support the rib loops of the last course of knitting against the action of the ribbing needles as they draw the new stitches tight, but as to yield readily to allow any knots or inequalities in the yarn in the finished portion of the knitting to pass between themselves and the principal needle plate. The patentee of this invention is John Chantrell, of Bristol, Conn.

CARTRIDGE.

This invention consists in providing a cartridge with a larger and a smaller chamber, the one surrounding the other, and each containing a separate charge of powder, the charge in the smaller chamber being fired before the charge in the larger one by the priming of the gun, and the charge in the larger one by the bursting of its chamber by the explosion of the smaller charge, and serving by its own explosion to act upon the projectile with the force necessary to project it. This device has been patented to J. W. Cochran, of this city.

MEASURE FAUCET.

This invention consists in the employement of a plurality of vessels attached to the cask or reservoir containing the liquid to be drawn, and arranged with partitions, one or more, and valves and cocks, whereby the liquor may be expeditiously drawn by measurement direct from the cask or reservoir, and the whole quantity required to be drawn at once, however much, enabled to be drawn continually, without waiting for vessels or measure to refill. M. W. Nalton, of Utica, N. Y., is the inventor.

ELECTRIC TELEGRAPH.

S. F. Van Choate, of Yreka, Cal., has an important improvement in electric telegraphs, the principal object of which is to effect a repetition of the signals from one line of electric telegraph to another in such a manner as to enable the operator at any station on one line to write or send messages to any or every station on another line or its branches, and to receive messages therefrom. The claim will enable its nature to be understood by persons familiar with telegraphs.

SPRINGS FOR HOOP SKIRTS.

The object of this invention is to obtain a machine for covering in a continuous manner the springs for hoop skirts, with any textile or other suitable fabric. The invention consists in the employment or use of glue or cement distributing rollers, cutters, guides, folders, and drawing and pressure rollers, whereby the desired end is obtained. The credit of this contrivance is due to John T. Loft, of Brooklyn, N. Y.

COMPOSITION FOR CLEANING AND SILVERING METAL.

Messrs. C. P. Brockett, E. Todd and John Brockett, of New Haven, Conn., have patented a most useful composition for coating metals, such as brass, with a cuticle of pure silver by simply rubbing on the compound With it harness and other articles upon which the silver plate has been worn, may be re-silvered with facility without fire, heat or an electric battery to deposit the precious metal.

JERSEY BITUMINOUS SHALE.—A seam of bituminous shale has been discovered near Plainfield, N. J. It is situated about thirty feet from the surface, and has a slaty appearance. It burns with a strong flame, somewhat smoky, and appears to contain considerable umen. Good coal oil can, no doubt, be obtained from it by distillation.

© 1860 SCIENTIFIC AMERICAN, INC.

INDUSTRY—MANUFACTURES—COMMERCE.

The Steamship Adriatic.—This noble vessel, after having made but one trip to Liverpool, and having ever since been lying idle, is soon to be put on Atlantic service. She is to ply between New York, Southampton, and Havre, and she will commence running early next month. Her last trial trip, it is stated, proved her machinery (as now altered and amended) to be excellent, and it is expected that she will make the fastest voyages of any steamer afloat. She belongs to the North Atlantic Company, and her cabin accommodations are unsurpassed for elegance and comfort.

The Oyster Business.—Our oyster trade is stupendous. The value of oysters packed in tin cans, in Baltimore, amouts to $3,500,000 per annum, for which no less than $250,000 worth of tin plate is required. During the past year the entire value of Baltimore oysters amounted to $4,500,000, and that of Virginia to nearly double this amount. Our oysters are mostly fished in the bays of Maryland and Virginia, and from thence carried to Philadelphia, New York, Boston, and other places. The Southern oysters are never served up in this region, as they come from their native waters; they are too poor for the palates of our epicures. To render them plump and pleasant, they are planted in the waters of Newark Bay and Long Island Sound, where they find the requisite aliment and soon fulfill the old adage "a change of pasture makes fat calves."

Domestic Goods.—There is a great buoyancy in the market for home manufactures of cotton, and business is in a most favorable condition, both for home consumption and export. The stock of woolen goods on hand is pretty large, and the market for them is somewhat depressed. Our total exports since Jan. 1, are as follows:

	Pkgs.	Value.
To British Australia	72	$3,050
Hayti	32	2,833
Venezuela (dry goods)	3	208
Brazil (dry goods)	1	150
Brazil	97	8,755
Cisplatine Republic	5	569
Argentine Republic	25	1,317
China	3,252	187,877
China (dry goods)	3	243
Total	3,480	$205,002
Previously	19,429	1,136,396
Total	22,909	$1,341,398

Another Explosion.—A boiler exploded in the Atlantic Foundry, Imlay-street, Brooklyn, on the 12th inst., by which the engineer (John Hazleton) was instantly killed, and two others wounded. The engine was broken to pieces and the house demolished. The greater portion of the boiler was impelled a distance of 80 feet, when it struck against a house, shattered the wall and fell back upon the side walk. It is believed that the water in the boiler fell below the fire line, and that it became red hot, and when the engineer let on some cold water the explosion at once followed. The evidence thus far elicited, in regard to the cause of this accident, goes to prove that the deceased engineer lost his life by his own carelessness.

The Homestead Bill.—This bill passed the House of Representatives in Washington, on the 12th inst., by a vote of 114 to 66. It provides that every person who is the head of a family, and 21 years of age may enter one quarter section (160 acres) of land, subject to pre-emption, and at the expiration of five years, if then a citizen, shall be entitled to a patent for it on payment of $10. We hope this bill will also pass the Senate at an early date. We have no doubt but much good will ultimately result from it to many workmen in our cities. The success of this measure is due to the "Land Reformers"—an organization of mechanics which was formed in this city about 15 years ago, and which has ever since continued to labor for this object with much zeal.

The Central Park.—Professor Renwick, in a letter to the New York *Times*, considers tbat $250,000 would have been a most liberal appropriation for embellishing the above park in the style of the "English Garden" near Munich in Bavaria. He says he knows every foot of the ground, that he surveyed the northern portion of it 40 years ago, and is perfectly familiar with the district. He considers the outlays of the commissioners extravagant, and the specifications which had been made by the engineer, for the work to be done, unworthy of the profession, as exhibiting great ignorance of surveying and engineering. A large number of our citizens have remonstrated against the extravagance of the commissioners, and have opposed the appropriations asked for and noticed in our last week's issue.

FOREIGN NEWS AND MARKETS.

The Atlantic Telegraph.—The directors of the Atlantic Telegraph Company have resolved to raise £20,000, to take up and restore to working condition the injured portions of the cable off the Irish and Newfoundland coasts. There have been £600,000 authorized to be raised as new stock by the company, but only £70,000 of this amount has been taken up conditionally.

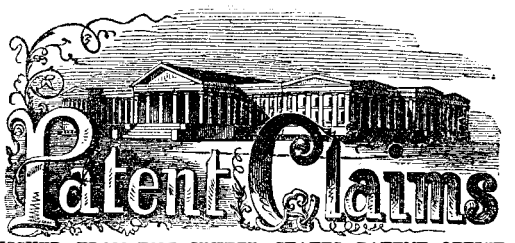
Exports to America.—The London *Times* says: "The shipments to the United States (which received a serious ckeck after the panic of 1857) have recovered to a point beyond their former scale, and are now more than 17 per cent of our total exports, foreign and colonial, and 27 per cent of our foreign exports alone. It is to be remarked that our trade with European States is every year becoming of a more secondary character, as compared with that which we have established among our Colonial and American progeny. It is to those quarters that the magnificent augmentation exhibited in the present total over 1858, and which renders it of unprecedented amount, is entirely due. The general increase is £13,831,671, while to the Colonies and the United States it was £14,022,424. The balance of our business carried on with all other parts of the world resulted therefore, in a falling off."

Exports to all the World.—The exports of Great Britain during the year 1859 were as follows:—Exported to British Possessions, £46,125,056; United States £22,611,283; all other countries, £61,764,098; total, £130,440,427; or about $625,202,135. This is an immense sum, and affords evidence that England is truly "the workshop of the world;" for no other country can approach it in the amount of exported manufactures.

Workingmen's College.—This college, which has now been established in London for several years, has progressed so satisfactorily that the institution has been removed to more commodious premises. During the past year from 200 to 300 students on an average have attended the various classes, which include among others, drawing, arithmetic, mathematics, geology, chemistry, English grammar and composition, Latin, Greek, French, and English, and Bible history. Of the students from October to Christmas, 1858, 109 out of 242 belonged strictly to the class of operatives, the remainder being principally clerks, tradesmen, tradesmen's assistants, and warehousemen. The operatives included, in the largest proportion, carpenters, cabinet makers, piano-forte makers, watch and clock-makers, opticians, printers, compositors, and bookbinders. The total number of students who joined the college in the first year was 400, in the second 350, in the third 260, in the fourth 296, and in the fifth, to the end of the second term, 169, making a total of 1,475. There are classes for women in connection with the college, in which cookery and domestic economy are especially taught, as also reading and writing, and vocal music, arithmetic, history, the Bible, needlework, and geography.

THE PHOTOGRAPHIC SOCIETY—A CURIOUS PHENOMENON.—The reports of the transactions of the scientific societies now being published in our columns are attracting much attention on account of the rare and useful information contained in them. We would direct particular attention to the remarks of Professor Draper, this week, in the report of the above society, in regard to the phenomena connected with the temperature and incandescence of bodies. He relates a remarkable circumstance regarding the colors of the spectrum being regularly developed as the temperature of a body advances, and in the same order which they are refracted in the prism. This is a philosophical fact, well worthy of being disseminated throughout the whole earth.

SEWING MACHINE CASE.—An important trial has just terminated in Boston between Elias Howe, Jr., and Ladd, Webster & Co., involving the validity of Howe's patent for sewing machines. Mr. Howe won his case. We hope soon to be able to present the points of this suit.



ISSUED FROM THE UNITED STATES PATENT OFFICE
FOR THE WEEK ENDING MARCH 13, 1860.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

27,415.—Ethan Allen, of Worcester, Mass., for an Improvement in Constructing Fire-arms:

I claim making or forming notches or catches on cylinders of fire-arms, or other work, by pressing or cutting, or both, in the manner and for the purposes as set forth and described.

27,416.—Edward Andrews and J. H. Carr, of Palo Alto, Pa., for an Improvement in Lubricating Journals:

We claim the combination and arrangement of the air-tight chamber, A, tube, B, valve, C, spring, H, and piston, D, with small hole, E, constructed and operated substantially as described.

27,417.—Peter Bailey, of Falls Township, Pa., for an Improvement in Grain Fans:

I claim the coupled rods, D and G, and D′ and G′, jointed to the frame, A, and to the shaker, B, arranged in respect to the inclined plane, b, and sieve, d, and operating substantially as set forth.

27,418—John Ballou, of Cincinnati, Ohio, for an Improvement in Adding Machines:

I claim the construction of the rings, C 1 C 2 C 3, marked on their peripheries with numerals, substantially as and for the purposes set forth.

27,419.—John W. Barcroft, of Friendship, Va., for an Improvement in Ditching Machines:

I claim, first, The combinations of buckets, or scoops, b, having hinged falling bottoms d, with a guard, E, of such shape that it keeps the bottoms of the buckets from falling, until the proper time for discharging the dirt which has been dug or scooped up, and then allows the bottoms to fall, and after the discharge of the dirt has taken place, raises the bottoms to their original position, ready for another digging or scooping operation.

Second, Combining the guard with the frame, a, which carries the buckets by means of brackets, e, having friction rollers, f, suspended on them, substantially as and for the purposes set forth.

27,420.—B. F. Barker, of Belfast, Maine, and I. F. Barker, of Montville, Maine, for an Improved Machine for Sawing Veneers Spirally from the Log:

We claim a traversing carriage carrying the devices, substantially such as are described, for holding and rotating the block, and feeding it to the saw, so as to saw it spirally from the periphery in towards the center, substantially as described.

27,421.—Curran Battle, of Warrenton, Ga., for an Improvement in Cotton Seed Planters:

I claim the arrangement of the frame, R, seed-box, A, wheels, B, handles, H, bottom, c c, cog-wheels, P P, the saw-toothed distributing wheel, N, the toothed cylinder, S, the plow, C, and the coverer, O, operating conjointly, as described, for the purposes specified.

27,421.—Joshua Bills, of Southington, Conn., for an Improved Sausage Machine:

I claim the spiral shaft, J, passing through the central slots, g, of the heads, L, essentialiy in the manner and for the purposes fully set forth.

I also claim the cutting knife, F, united solidly to a metal bar, G, by its being cast thereon, and forming a cavity, H, in the bottom of case, A, to receive the knife, and so position it by the single screw, I, essentially in the manner and for the purpose fully set forth.

I also claim the forward end of the stuffer being concave at C 2, and the feeding end having a portion of its spiral wings removed at B2, and inclined planes, m, inserted essentially in the manner and for the purposes fully set forth.

I also claim the arrangement of the case, A, the stuffer, X, and its case, W, so that both the cutter and stuffer may be operated in the same case, essentially in the manner and for the purposes fully set forth.

27,423.—C. C. Bomberger, of West Carlisle, Pa., for an Improved Wind Wheel:

I claim the arrangement and combination with the slats, C, of the vertical connecting bars, D, vertically moving cam, E, and governing lever, F, so that as the motion of the wheel increases or diminishes, the lever, F, will correspondingly raise or lower the cam, E, and thus regulate the speed of the wheel, all as herein shown and described.

[This invention relates to an improved means for regulating the speed of the wheel, and consists in the use of a cam actuated by a lever connected with a suitable governor, the cam being so arranged with slats composing the wings that the slats will, as the wheel rotates, be closed to a greater or less extent at certain and necessary points of its rotation in order to effect the desired end.]

27,424.—I. W. Bowers, of Cincinnati, Ohio, for an Improvement in Railroad Chairs:

I claim providing wrought iron railroad chairs with the curved lips or flanges, A′, b, substantially as and for the purposes set forth.

27,425.—C. P. Brockett, E. Todd, and John Brockett, of New Haven, Conn., for an Improved Composition for Cleaning and Silvering Metals:

We claim the compound of "silver soap" herein described, consisting of an alkaline solution of silver soap, carbonate of lime and alcohol, in about the proportions stated, and for the purposes of cleaning and plating metals as set forth.

27,426.—Adolph Brown and Felix Brown, of New York City, for an Improvement in Steam Pumps:

We claim, first, Connecting together the steam and pump cylinders of steam pumping engines by means of frames or stretchers, which contain the bearings of the crank shaft—constructed and arranged as described, and for the purpose set forth.

Second, The hinged valves constructed as above described, when the same are arranged and used in combination with steam pumping engines, as set forth.

27,427.—Walter R. Bush, of Albany, N. Y., for an Improvement in Wheel and Dress Guards for Carriages:

I claim, first, The attachment to the door of a carriage of a sliding guard, substantially as set forth.

Second, The method of operating such guard by means of a pulley containing a helix spring to raise the guard and maintain it in place; the spring being relaxed by an attachment from the pulleys to the body of the carriage, or by such lever and spring arrangements as are a mechanical equivalent for the same, substantially as set forth in the above specification.

© 1860 SCIENTIFIC AMERICAN, INC.

27,428.—John W. Cochran, of New York City, for an Improvement in Cartridges for Fire-arms:

I claim the employment within the cartridge of two distinct charges of powder, substantially as shown and described, so that one of said charges will explode and start the projectile before the other charge is ignited, all as specified.

27,429.—J. W. Conway, of Franklin, Ind., for an Improvement in Cotton and Hay Presses:

I claim the employment of the screw, F, the toothed wheel, H, the conical pulleys, I I and J, and the cords, a a and c, when the same are arranged together and used in connection with the moving press head, B, substantially as and for the purpose set forth.

27,430.—John Chantrell, of Bristol, Conn., for an Improvement in Knitting Machines:

I claim, first, So applying a series of sinkers in a ribbed knitting machine that they work between the two series of needles simultaneously, substantially as described.

Second, The arrangement, in combination with a series of sliding sinkers, of a series of bearded needles, a a, and a series of latch needles, i i, arranged obliquely in opposite directions to a line perpendicular to the sliding movement of the sinkers, as illustrated in Fig. 1, and herein described.

Third, The series of plates, t t, applied substantially as described relatively to the two series of needles, to support the last completed course of rib loops against the action of the rib needles in forming the new course.

27,431.—Addison Crosby, of Fredonia, N. Y., for an Improvement in Induction Valve Gear for Steam Engines:

I claim, first, Combining the reciprocating rod, G, with the stems or shafts, a a', by means of dogs, F F', attached to the said stems or shafts, and catch bars, M M', or their equivalents attached to the said rod, when the said catch bars or equivalents are so constructed and applied to the said rod, and so controlled as to liberate the dogs during the stroke of the engine by a positive movement away from the said dogs, and transverse to the movement of the reciprocating rod, substantially as described.

Second, Controlling the liberation of the catch bars, M M', by means of blocks, N N', or their equivalents applied to slide on the reciprocating rod, I, from which the valves derive their opening movement, substantially as set forth.

Third, Providing for the variation in the lead of the valves by so constructing the catch bars, M M', attached to the reciprocating rod as to be capable of being lengthened or shortened, as herein specified.

[This invention consists in the combination of a bar or rod deriving a regular reciprocating motion from the engine with the stems or shafts of two oscillating valves or with two rockshafts suitably applied in connection with two valves of any other description, by novel means, whereby the induction of steam is enabled to be effected with such amount of "lead" as may be desired, and the cutting off to be effected by the tripping or sudden liberation of the valves at any point in the stroke under the control of a governor or of suitable means of adjustment at the command of the engineer.]

27,432.—Addison Crosby, of Fredonia, N. Y., for an Improvement in the Eduction Valve Gear of Steam Engines:

I claim the combination of the reciprocating rod, C, with the stems or shafts, b b', of the valves by means of arms, A A', and wrists, a a', attached to the said stems or shafts, and slotted links, J J', attached to the said rod; the whole arranged substantially as herein set forth.

[This invention consists in the combination of a bar or rod deriving a regular reciprocating motion from the engine, with the stems of two oscillating eduction valves or with two rock shafts suitably applied in connection with valves of any other description, by means of arms on the stem or shafts and slotted links attached to the rod to operate in combination with the said arms in such a manner that the valves are made to open quickly at the commencement of the stroke of the engine, and to remain wide open during nearly the whole stroke, but to close so gradually as to prevent slamming when valves of such construction as to be liable to slam are used.]

27,433.—Wilbur M. Davis, of Carmel, Maine, for an Improvement in Shoe Tips:

I claim the construction of such a tip or cap of wire cloth or gauze, or other braided, woven, or netted fabric of wire, whether of copper, brass, or any other metal, and the application of the same to a boot or shoe, sewed, nailed, or pegged or cemented, whether turned or otherwise, for the purpose of protecting the leather or other material of the shoe or boot from injury by wear or ordinary blows.

27,434.—George Draper, of Milford, Mass., for an Improvement in Machinery for Spinning:

I claim, in combination with the drawing mechanism of a spinning machine, a mechanism which, as the quantity of yarn wound on a bobbin or a spindle of such machine may increase, and the front set of drawing rollers may be moved with a uniform or given speed, shall so decrease the motion of one or more of the remaining sets of drawing rollers relatively to the motion such may have on being started, as to cause the yarn spun and wound around the bobbin to have a uniform size.

27,435.—Spencer B. Driggs, of New York City, for an Improvement in Piano-fortes:

I claim, first, The employment, in a piano-forte, of a bridge or bridges of a depth equal to, or nearly equal to, the whole depth between the strings and the bottom or back of the case, in combination with a single sound board which either constitutes the back of the case or is arranged in the extreme lower or rear part of the same, substantially as described.

Second, The employment, for the purpose of holding the strings at either or each of the bearings or points between which they severally vibrate, of a clamp, G, constructed with two jaws, and applied, substantially as herein described, so as to be made to bite and clamp the string or strings by the same screw which screws it to the block, plate, or bridge, as set forth.

27,436.—B. Wells Dunklee, of Boston, Mass., for an Improvement in Ranges:

I claim the construction and application of the dividing plate, E, in the form as above described, in relation to the inducting flues, D D, the bed plate, F, the check plates, a, and with respect to the damper, K, top check plates, h h, and ovens, d d, substantially as and for the purpose set forth.

I also claim the annular, e, with its openings, m f, constructed and applied with respect to the damper, K, top check plates, h h, ovens, d d, and dividing check plates, E and a, and in relation to two inducting flues, D D, substantially and for the purpose above described.

27,437.—John Fasig, of Congress, Ohio, for an Improvement in Pruning Implements:

I claim the combination of an angular cutting edge b', the double-edged saw, a'' c, and hook, d, when all these parts are combined in one instrument, substantially as described, and operating as set forth.

27,438.—William Ferguson and David Ferguson, of New York City, for an Improvement in Blackwashing Molds for Casting:

We claim blackwashing retort, pipe, or other molds by means of the piston, D, provided with the hollow rod, E, and having felt cloth, F, or other material around its edges, and brush, G, combined, or by either the piston and felt cloth or brush separately or equivalent device supplied with the blackwash, and operating as before described.

27,439.—Lawrence F. Frazee, of New Brunswick, N. J., for an Improvement in Ash-sifters:

I claim arranging in the box, A, a double bottom, C, with an aperture, I, substantially as and for the purpose specified.

[The sieve of this sifter is agitated by means of an undulating ring running around the same, and the case is so arranged that the stones and cinders can be separated from the good coal without emptying the sieve, rendering the whole very convenient and easy to operate]

27,440.—Dennis C. Gately, of Newtown, Conn., for an Improvement in Elastic Belting:

I claim the belt or band produced with a friction surface as smooth as it practically can be by grinding or polishing down the rough or unequal surface of the belt, substantially in the manner and for the purposes described.

27,441.—T. J. Gifford, of Salem, Mass., for an Improvement in Securing Scaffolding Brackets to Buildings:

I claim the combination with brackets, A B C, and the knee plate, E E', of the screw, G a f, and key, J, all arranged in the manner and for the purposes set forth.

27,442.—Richard Gill and George W. Grier, of Altoona, Pa., for an Improvement in Furnaces for Steam Boilers:

We claim a deflector composed of two walls, B'' B''', which enclose an air passage, C, between them; and when the wall, B'', is furnished with openings, and the wall, B''', is tight, and both projecting forward over the fire, and when constructed, arranged and operating substantially as described and for the purpose set forth.

27,443.—Jackson Gorham, of Bairdstown, Ga., for an Improvement in Organ Pipes:

I claim constructing organ pipes with two musical throats and mouths both communicating with the foot, d, for the purposes and substantially as set forth.

[The object of this invention is to increase the quantity and quality of sound in organ pipes, and in that species technically known as the flute pipes, by doubling the "speaking" qualities of each pipe as will be understood from the above claim.]

27,444.—Henry H. Graham, of Paterson, N. J., for an Improvement in Connections for the Ends of Railroad Rails:

I claim the tapering connecting bar provided with the lugs, l l, entering holes in the rails, in combination with the clamp, e, driven on to said wedge, substantially as specified.

27,445.—John Guyer, of Westport, Conn., for an Improvement in Cultivators:

I claim the arrangement of the hoes, A, springs, F, guides, K, handle, D, axle, B, and tubes, J, as and for the purposes shown and described.

27,446.—Jason W. Hardie, of New York City, for an Improved Churn:

I claim the combination of the hollow revolving cylinder containing hot water, or its equivalent, with a fixed surface fitting against its periphery and adjustable to different degrees of closeness thereto, whereby not only are the cream globules effectually crushed, but the requisite degree of temperature is imparted to the cream only momentarily while passing beneath the cylinder, and is again dissipated mostly by the falling of the cream into the churn body below, substantially as specified.

27,447.—Levi Heywood, of Gardner, Mass., for an Improved Chain for Timber-bending Machines:

I claim the chain herein described, operating as set forth.

27,448.—W. W. Horton (assignor to himself and Lucius O. Vebber), of Schuyler's Lake, N. Y., for an Improvement in Water Wheels:

I claim the specific construction of the bucket hereinbefore described, embodying a straight line in combination with an involute of a circle; the straight line and involute being relatively arranged to each other and the face of the wheel as set forth.

27,449.—H. M. Hutchinson, of Baltimore, Md., for an Improved Furnace for Railroad Cars:

I claim the hot-air chamber, A, combustion chamber, C, and feeder, F, arranged as described, in relation to one another and to the car, and so that the cold air received by the combustion chamber may be drawn from the interior of the car.

27,450.—Edward Julier, of Beverly, Ohio, for an Improvement in Cultivators:

I claim the arrangement of the slotted, adjustable, laterally connected compound beam and stock, g g 2 h and L L M, Figs. 1, 3, 4, when combined with the solid wrought metal compound mold and share, d e n o s, Fig. 5, and when said combination is so arranged as that the heel or butt end of one cutting edge over-cuts the point or toe of the advance share, admitting also of being adjustable more or less forward or backward relative to each other, substantially as set forth and described.

27,451.—John P. Kennedy, of Trenton, N. J., for an Improvement in Clay Gas Retorts:

I claim the securing of the mouth-piece to an earthern retort by means of an iron yoke or band firmly clasping the neck of the earthen retort behind the collar, and having bolts on the outside of the retort passing to the flanch or mouth-piece—thus securing the earthen collar between the mouth-piece and the yoke or band; the whole being substantially as described.

27,452.—Lucius J. Knowles, of Warren, Mass., for an Improved Safety Feed Apparatus for Steam Boilers:

I claim the combination of the balls, E and F, placed outside and communcating with the boiler at different levels beneath the water line, and so arranged as to operate successively, the one to regulate the pump and the other to operate the whistle, as set forth.

27,453.—David Knox and Thomas Ditchburn, of Lynn, Mass., for an Improvement in Sole-cutting Machines:

We claim, first, Giving a reciprocating or vibrating motion to the head, D, by means of the slot, g, and pin, 9, substantially as set forth and for the objects specified.

Second, The use of an eccentric bush in the eye of the connecting rods, substantially as described, for the purpose of raising or lowering the knives.

Third, Giving a lateral motion to the back gage by the use of a swivel, T, or in any equivalent manner, as described, so that both knives may be made to cut the same sized sole.

Fourth, The use of the double crank for actuating the connecting rods, E F, in combination with the movable head, D, substantially as and for the objects specified.

27,454.—Reinhold Landstrom, of Boston, Mass., for an Improvement in Coffee-roasters:

I claim constructing the lining of a coffee-roaster of staves or pieces and heads of soapstone, and a metallic frame, applied together substantially as described.

And I also claim the mode of making each bar or stave provided with steam escape holes, viz.: with a channeled or grooved external surface, so as to form with the outer case of the roaster a steam passage open at the ends of the stave, and to be so covered at the outer case that the coffee may be protected from the smoke and gases of the furnace, as specified.

27,455.—George W. Lane, of Boston, Mass., for an Improved Method of Testing Hollow Spheres for Water Gages and other purposes:

I claim the described mode of testing hollow floats, to be used in steam boilers or other vessels in which great heat and pressure, or either, may be employed.

27,456.—John Loft, of Brooklyn, N. Y., for an Improved Machine for Covering the Springs of Skeleton Skirts:

I claim, first, Covering wires or springs for hoop skirts by passing the same, in connection with strips or covers of suitable fabric having a suitable glue, cement or adhesive substance applied to them through folders, P, and between drawing and pressure rollers, L M, arranged to operate substantially as and for the purpose set forth.

Second, The use of cutters, a, and disks or guides, b f, placed respectively on the shafts, F G K, in connection with the roller, B, on which the fabric is wound, the glue or cement reservoir, H, and the rollers, I J; all being arranged substantially as and for the purpose specified.

Third, In connection with the glue or cement reservoir, H, and rollers, I J, the reservoir, C, and roller, D, arranged relatively with each other, and the disks or guides, f, on the shaft, K, to operate as and for the purpose specified.

Fourth, The combination of the drawing and pressure rollers, L M, folders, P, roller, N, glue or cement reservoir, C H, with their rollers, D I J, the roller, B, cutters, a, and guides, b f, arranged for joint operation as and for the purpose specified.

27,457.—Francis C. Lowthorp, of Trenton, N. J., for an Improvement in Plate for Securing Chords, Braces, &c., of Truss Bridges:

I claim the combination of plate, A, with open slots adapted to receive, and arranged in respect to the enlarged ends of the chord rods, G and G', and also arranged to receive the verticals and diagonals of a truss, frame or other bridge, substantially as and for the purpose set forth.

27,458.—Edward Mattacks, of Lyndon, Vt., for an Improvement in Shutter Operators:

I claim the combination of devices set forth for controlling the movements of a window blind, whereby it may be unlatched, opened or closed and re-latched, as circumstances may require; such devices being the rectangular tube, C, the spring catch bar, D, and the cord, f; the same being arranged and made to operate together substantially in manner as set forth.

27,459.—Thos. H. McCray, of Tellico, Texas, for an Improvement in Cotton Presses:

I claim the arrangement of the toggle arms, E E E E, so as to connect all the four bale boxes, as described, in combination therewith, whereby the same action of the power applied will both effect the pressing in one pair of bale boxes and bring back the other pair of bale boxes ready for pressing again, substantially as specified.

I also claim the employment of movable bale boxes, in combination with stationary bed blocks, substantially in the manner and for the purposes specified.

27,460.—S. T. McDougall, of New York City, for an Improvement in the Manufacture of Gas:

I claim the combination of an air blast, a vaporizing chamber, a retort and furnace, a purifying vessel and a gasometer, arranged and constructed substantially as described.

27,461.—Thos. E. McNeill, of Philadelphia, Pa., for an Improved Hot-air Register:

I claim, first, Combining a net work, or its equivalent, of fibrous or other material capable of absorbing moisture, and a water reservoir with a hot-air register, substantially in the manner and for the purpose set forth.

Second, I claim the plate, I, with its projection, i, when connected with the bar, D, and arranged in respect to the partition, e, as and for the purpose set forth.

27,462.—William Mitchell, of New York City, for an Improvement in Apparatuses for Revivifying Bone Black:

I claim, first, Placing the cast metal plates, I I, on the fire arches, J, arranged as shown, to wit, two being placed longitudinally in the chamber, A, and the other transversely in a perforated partition, for the purpose of properly sustaining the plates, I I, and at the same time permitting of a proper draught.

Second, The employment or use of two series or rows of chambers or tubes, G H, placed at one or both sides of the fire chamber, when said chambers or tubes are placed in the position as shown, and the outermost rows made of smaller capacity than the innermost one, for the purpose specified.

Third, Having the chambers or tubes, G H, made transversely, of egg-form (or of greater dimensions at one of their shorter curved sides than at the opposite ones), and also made longitudinally and transversely of varying thickness, substantially as and for the purposes set forth.

Fourth, The arrangement of the flues, J' K, in connection with the chambers or tubes, G H, as and for the purpose described.

Fifth, The connecting of the coolers, F, to the tubes, d, of the chambers, G H, by means of the ears or lugs, f, and hooks or pins, g, as set forth.

Sixth, Forming the plates, k, with fluted surfaces, so as to produce valleys or gutters, l, and placing said plates in an inclined position on the top of the chamber, L, for the purpose set forth.

Seventh, Connecting the chamber, L, with the flues, J' K, in the manner substantially as shown and described, so that the burning and drying processes may be performed simultaneously with one and the same source of heat.

27,463.—Geo. E. Mills, of New York City, for an Improved Ore-washer:

I claim the channels, the revolving rakes diverging from the center, the oblique riffles in the disk, and the flattened or half-round flowpipe; all in combination as specified and for the purposes set forth.

27,464.—Andrew J. Moser, of New York City, for a Book-ruler:

I claim the book-ruler, with curved ends, herein described and represented.

[This invention consists in curving the ends of a ruler in opposite directions, and leveling the edges of the same in the usual manner, so it may be used either side up as a useful book-ruler.]

27,465.—M. W. Nalton, of Utica, N. Y., for an Improved Measure Faucet:

I claim, first, The employment or use of a plurality of hollow cylinders or vessels, A B, connected by tubes, C, provided with cocks, arranged substantially as shown and described, to admit of the alternate filling and discharging of the vessels, for the purpose described.

Second, The dividing of one or more of the hollow cylinders or vessels into compartments by means of the partitions provided with the valves, g h, and rod, H, arranged as shown, to admit of the drawing-off of the contents of one or more of the compartments, as occasion may require, in connection with the index, I, and graduated arc; all for the purpose and in the manner set forth.

27,466.—John North, of Middletown, Conn., for an Improvement in Drop Letter-boxes:

I claim, first, The applying to a drop letter-box the inner lid, for the purpose of preventing the abstracting of letters from the aperture of the letter-box, as described.

Second, I claim the inner lid, in combination with the outer lid, attached to a drop letter-box, whereby the inside lid is closed on opening the outer lid, for the purpose as described.

27,467.—Geo. W. Osborn, of Centerville, Mich., for an Improvement in Grain-cleaners.

I claim the arrangement of the trough, d, the elevators, D, the fan, E, and the shoe, as constructed; the trough being placed at the bottom of the shoes, with one end passing into the elevator case, and having an independent longitudinal vibration, substantially as and for the purpose set forth.

27,468.—B. E. Orton, of Lyndon, Ill., for an Improvement in the Mode of Applying Horse-power to Mills:

I claim the combination of the toothed rim, G, stationary pinions, d d, adjustable pinions, b b, mill, D, and the bevel gearing, I J, with shaft, K, arranged substantially as and for the purpose set forth.

[The object of this invention is to combine a horse-power and grinding mill in such a way that a very compact mechanism will be

© 1860 SCIENTIFIC AMERICAN, INC.

obtained, and one that will admit of the miil being detached and other machinery connected, when required, so as to be driven by it. The invention is designed chiefly for the use of farmers and others, who require horse-power of a portable character and simple in construction, and with whom a grinding mill is the essential feature or the most important device to be driven.]

27,469.—F. I. Palmer, of Knoxville, Tenn., for an Improvement in Car Seats:

I claim combining a self-locking clasping apparatus with either or both of the shoulder plates, B, of a car seat, substantially in the manner and for the purpose represented and described.

27,470.—F. S. Pease, of Buffalo, N. Y., for an Improvement in Hydro-carbon Vapor Apparatuses:

I claim the combination of the box, A, when provided with a supply pipe, C, at the top, and with pans, B, and plates, b, as shown, with the condenser, E, constructed as set forth; the whole operating in the manner and for the purpose represented and described.

[The object of this invention is to facilitate the operation of impregnating inferior gas with the vapor of hydro-carbon liquids, such as naphtha, benzoles, ether, &c. The gas passes over a series of shallow pans filled with the liquid; and, in order to cause the gas to absorb the vapor more readily, it is compelled to pass through a series of stops of wire gauze or perforated sheet metal, whereby a number of minute streams of gas are brought in contact with a similar number of streams of vapor, causing both to intermingle quite readily.]

27,471.—James Peatfield and Sanford Peatfield, of Ipswich, Mass., for an Improvement in Elastic Belting:

We claim, as a new article of manufacture, india-rubber belting made upon a knitted foundation, and having a slight degree of elasticity, as set forth.

27,472.—John Protz, of Easton, Pa., for an Improved Knife and Fork Cleaner:

I claim the box, A, provided at one end with the pressure block, k, attached to springs, b b, in connection with the leather, B, secured to the inner side of the lid, A, of the box, and connected at one end to a slide, d; all being arranged to form an improved article of manufacture for the purposes specified.

[The object of this invention is to obtain a simple and convenient device by which both knives and forks may be expeditiously cleaned in a thorough manner. The invention is designed for ordinary family use, and to be operated manually.]

27,473.—Lewis L. Reynolds, of Manchester, N. H., for an Improved Window Screen:

I claim the combination and arrangement of the frame, A, with the rods, C C, the pins, D, and springs, E, substantially as and for the purpose set forth.

27,474.—William Riker, of Newark, N. J., for a Process of Embossing Designs on Metal for Jewelry:

I claim, first, The use of the softer metal, as at K (Fig. 1), substantially in the manner and for the purposes described.

Second, I claim the use of the die roll, A (Figs. 1 and 2), substantially in the manner and for the purposes set forth.

27,475.—E. D. Rosencrantz, of New York City, for Improved Telegraph Wires:

I claim, first, The employment of a compound wire for telegraphs, consisting of a silver center and outside of copper (or other equivalent metals in which the center is the best conductor) for the purposes set forth.

Second, I claim, in placing telegraph wires, the selection of the end leaving the draw plate for the purposes substantially as set forth.

27,476.—E. A. G. Roulston, of Roxbury, Mass., for an Improvement in Trunks:

I claim, as a new article of manufacture, a trunk made of corrugated metallic plates, applied together substantially as set forth.

27,477.—Silas C. Schofield, of Freeport, Ill., for an Improvement in Harrows:

I claim, first, The combination, with the teeth of a rotary harrow, of a strip of metal running spirally from end to end of the harrow, and fixed at an intermediate point between the ends of the teeth and the harrow shaft, as set forth.

Second, I claim, in combination with the harrow frame and rotary harrows, of the wheel, G, hung in arms, H H, which are jointed to the main frame, standards, J J, and driver's seat, K, when this seat is connected to the frame by jointed braces, L L, and furnished with a set screw, h, for raising the frame, A A, in the manner set forth, at the same time allowing the frame to swing freely on the joint, a, and adapt itself to the unevenness of the ground.

[This invention consists, firstly, in arranging along the sides of a quadrangular frame four peculiarly-constructed rotary harrows, which harrow and pulverize the earth at the same time; these are arranged at right angles to each other, and at an angle of about 45° with the line of draught, for the purpose of harrowing and cross-harrowing the earsh and preparing it for receiving seed, and then harrowing in the seed which falls between the front and rear harrows. It consists, secondly, in a novel mode of hanging the harrow frame so that it will accommodate itself to the unevenness of the surface of the ground, and so that the harrow may be raised from the ground by the driver, when necessary.]

27,478.—William Sellers, of Philadelphia, Pa., for an Improvement in Turning Lathes:

I claim, first, Constructing lathe heads in the form of a hollow box, and revolving the spindle in journals which are connected together and surround the spindle throughout its length, substantially as described and for the purposes specified, whether said journals are so arranged as to form a continuous bearing throughout the entire length of the spindle or not.

Second, I claim attaching the heads of a lathe to the bed in such a manner that a line drawn from the axis of a spindle perpendicular to the upper surface of said bed shall fall on or about the back edge of the bed, substantially as described and for the purpose specified.

Third, Constructing lathe beds with their upper surfaces horizontal, or substantially so, when this is combined with one other surface on the bed and corresponding surfaces on the heads, which surfaces being brought in contact shall insure the parallelism of the axis of the spindle, substantially as described.

Fourth, I claim the use of a plate bed having its upper surface divided longitudinally into two similar parts, each part having its edges beveled so that the slide rest may be attached to either side, substantially as described and for the purpose specified.

Fifth, I claim the combination of the internal and external gearing on the same face plate, for the purpose of obtaining the required variation of speed and of stiffening the plate, substantially as described.

27,479.—William Sherburne, of Charlestown, Mass., for an Improvement in Scarf Pins:

I claim locking the pin, b, by turning the screw, d, substantially in the manner set forth.

27,480.—William H. Sherwood, of Greenwich, Conn., for an Improved Composition for Artificial Stone:

I claim the within-described composition of Keen's cement, alum, soluble glass, rosin and water, mixed together in about the proportion stated, and for the purposes specified.

[The marble produced by this composition imitates, in its color and weight, the genuine marble so closely that it can be discriminated only by persons well acquainted with both materials; and, in regard to the influence of acids or other liquids on it, the imitation marble is vastly superior to the genuine article, as it does not become stained by water, oil or by any of the common acids.]

27,481.—Robert A. Smith, of New York City, for a Street-sweeping Machine:

I claim the arm or lever, B, hung on and concentric with the main broom shaft, a, moving as a radius therefrom; the lower part of said arm runs on the street by means of slides or rollers; the upper end, Y, is adjusted and secured as described.

I also claim the cup or concavity, J, and inclined plane, I, immediately under, and adjusted to, the circle described by broom, G.

I also claim the inclined plane or spout, K, for conveying the dirt delivered by broom, G, into rows outside the cart wheel; this inclined plane can be supported at the highest end by hinges or springs or by their equivalents; the lower end by chains.

27,482.—T. J. Southard, of Richmond, Maine, for an Improved Hawse Pipe:

I claim a hawse pipe extending into or through the side of the vessel, and provided on the outside end with a flanged head and cheeks containing a roller, substantially as described, for the purposes set forth.

27,483.—Marcus Stevens, of Detroit, Mich., for an Improved Self-adjusting Reclining Chair:

I claim, first, The arrangement of the apron or front piece, C, hinged to the seat, in combination with the braces, b, secured to the sides of the apron and hinged to the arms, D, and pivoted to the stationary frame or body of the chair between the arms and the seat, substantially as shown and described.

Second, The detachable foot board, in combination with the hooks in the backs of the front legs, and made reversible relatively to the front or apron piece of the chair for attachment thereto at pleasure in either of the two directions specified.

27,484.—Thos. Thorp, of New York City, for a Cigar-heading Socket:

I claim the cigar-heading socket made in one, two or more parts, so constructed and arranged as to be attached to any cigar-making machine, or in such a manner that the socket can operate to give a proper finish to various sizes of cigar heads, substantially as set forth.

I also claim, in connection therewith, the hinging of the parts, A and E, at the point, a, for the purpose set forth.

I also claim the said cigar-heading socket, with the opening, m, made in the form and so as to operate as described, whether with or without the hinge, a.

27,485.—Augustus Tufts, of Malden, Mass., for an Improvement in Lanterns:

I claim in a lantern the combination of a series of horizontal refracting zones or belts formed on the exterior of the lantern, with a series of vertical ribs formed on the interior thereof, substantially as described, whereby the lights are both multiplied and elongated, as set forth.

27,486.—Enoch B. Turner, of Providence, R. I., for an Improvement in Brakes for Railroad Cars:

I claim the simultaneous operation, by the momentum of the train, of the brakes upon the shoes on the wheels, in two or more railroad cars, through the action of the bar, A, connected with shoes, in the manner substantially as described.

I also claim the stirrup, D, and its combination with the cord described; one extending thtough the train, and the other connecting that cord with the stirrup, substantially as described for the purposes set forth.

27,487.—David Utley, 2nd, and Pell Teed, of Leicester, N. Y., for an Improvement in Straw-cutters:

We claim the arrangement of the knives, K K', levers, L l, pitmans, P p, slotted guide, G, crankshaft, S, hopper, H, concave bed, c, and toothed roller, R, as and for the purposes set forth.

27,488.—John Walch, of New York City, for an Improvement in Stoves:

I claim the application and combination, with a stove, of an air-chamber, constructed and arranged as described; said chamber rising directly from the lower part of the stove base until within a short distance of the top of the stove, and forming first the back part of the fire-place or fire-pot, and then a distinct division in the stove from one side to the other side of the stove, whereby the flame and gases are made to pass upon the front, over the top and down in the rear of said chamber to the smoke pipe, in the manner and for the purpose substantially as specified.

27,489.—A. T. Waldo, of Dryden, N. Y., for an Improvement in Grain-cleaners:

I claim the combination of the fan, B, spouts, O and S, valve, V, and spring, F, the cup, R, slide, K, and projection, P, when constructed and arranged as specified, for the purpose of cleaning grain as the same is fed into the eye of the millstone.

27,490.—Wm. Watson, of Bishopville, S. C., for an provement in Plows:

I claim the combination of the pivoted clamping hook plate, E, fastening wedge, f, standard, B, and moldboard, D, substantially as and for the purposes set forth.

27,491.—Francis F. Wells, of Texana, Texas, for an Improvement in Pessaries:

I claim, in the construction of pessaries, the particular manner of hinging the ring to the tube, and to the lever, c, passing through said tube, so that the said ring may be readily turned on the tube and firmly held thereto when in its proper position for supporing the uterus, as substantially set forth and explained.

I also claim the particular manner of uniting the ring to the frame, viz., by means of the recesses in the ring and the swinging button, S, on the lever, b, the whole being arranged and combined for the purpose of ready removal and replacement of the ring, for cleansing the instrument or changing the ring, substantially as represented.

27,492.—Wm. Orton Williams, of Washington, D. C., for an Improvement in Bridle Reins:

I claim the combination of a ring, or its equivalent, with the crossed reins of a bridle, and this I claim whether combined with the martingale or not.

27,493.—R. A. Wilder, of Cressona, Pa., for an Improvement in Railroad Switch Stands:

I claim the so arranging the lever, b, that connects the bolt, e, with the main lever, C, as that the operator, by one hand, may seize and operate both levers, substantially in the manner and for the purpose described.

I also claim, in combination with the lever, C, and the bolt, e, a locking mechanism, and the shield, F, for protecting the lock and bolt, substantially as described.

27,494.—Reuben Wood, of Grand Ledge, Mich., for an Improvement in Jacks:

I claim the combination of the pawls and ratchet bar with the disks, D1 D2 D3, having annular inclined tracks, E F, on their faces, between which rollers or balls may travel continuously in one direction, or alternately back and forth, in such a manner as to change the progressive speed at which the ratchet bar is worked by a different manipulation of the hand lever, substantially as and for the purposes specified.

27,495.—Horace Woodman, of Biddeford, Maine, for an Improvement in Machines for Cleaning Machine Cards:

I claim, first, Raising, suspending, cleansing and replacing the top flat cards by incline planes, J, moved within the carding machine and between the arches and the end of the main cylinder, and the brush bar, L, placed, secured to and operated by and between these incline planes and over the card cylinder, essentially in the manner and for the purposes fully set forth.

Second, I claim the secondary incline planes, M, as constructed and connected to the main incline planes, J, as to elevate themselves by contact with top flat cards, and they in turn elevate the top flat cards when these incline planes, M, pass from the feed roll towards the doffer, and they being depressed by contact with, and also the top flat cards with them in the return movement, and bring the card teeth of the cards and brush bar effectually together for cleansing the cards, essentially in the manner and for the purposes fully set forth.

Third, I claim imparting an intermittent motion to the brush bar, L, by the combination and arrangement of the notched wheel, D2, pawl, E, and cam, G2, in the manner set forth.

Fourth, I claim imparting to the incline planes, J and M, a complete and then a partial movement to first cleanse all the top flat cards once, and then one or more the second time, and then back again to give an increased or double cleansing to the top flat cards most needing it, essentially in the manner and for the purposes fully set forth.

Fifth, I claim imparting first a complete and then a partial movement to the brush bar, L, by means of the stud, H2, and arm, I2, combined with pawl, E2, cam or guide, G2, and wheel, D2, or any equivalent combination, essentially in the manner set forth.

Sixth, I claim so arranging and operating the brush bar, L, in combination with comb, T, that the latter will cleanse the former at each cleansing it gives the top flat cards, essentially in the manner and for the purposes fully set forth.

27,497.—A. J. Woodworth, of Henrico county, Va., for an Improvement in Soap:

I claim, as an article of manufacture, a compound soap, which has for one of its ingredients bleaching soap, and which is made substantially of the ingredients set forth in the proportions specified.

27,497.—Abram Gaar (assignor to himself, J. M. Gaar and W. G. Scott), of Richmond, Ind., for an Improvement in Grain-cleaners:

I claim separating the grain chaff and straw by providing the grain-carrier as well as the straw-carrier with separate boards, E K, on which the grain is collected, and from which it is discharged separately to the fanning mill, substantially in the manner and for the pose described.

I also claim arranging the upper line of the open straw-carrier below and under the lower line of the cell-carrier, when combined with a shaker, F, and with the separating boards, E g K, so as to produce a fall between the two carriers for the purpose of facililtating the separating of the grain from the straw, as described.

27,498.—Francis A. Hoyt (assignor to himself, Geo. W. Lane, Wm. G. Howe and Alfred W. Adams), of Boston, Mass., for an Improved Magnetic Gage for Steam Boilers:

I claim the arrangement of the lever arm box, D, the indicator, steam column and case, and the float lever, and float, together and relatively to the boiler head, substantially as described.

I also claim the application of the fulcrum bearings to the lever arm box, and so as to be movable therewith and separate from the boiler head.

I also claim my improved arrangement of the magnet and its armature with reference to the interior or steam space of the boiler, the said arrangement consisting not only in placing the magnet in an indicating or other proper chamber, entirely insulated from or having no connection with the said steam space or the armature chamber, so that steam can pass therefrom into the magnet chamber, but in arranging the armature with respect to the magnet and applying the float to the armature, so as to operate it substantially in manner as described.

I also claim combining a separate index pointer with the magnet so as to extend therefrom, as specified.

27,499.—Wm. L. R. Mattason (assignor to himself and J. M. French & Co.), of Rochester, N. Y., for an Improved Feathering Paddle Wheel:

I claim the bearing resting arm or shoulder, substantially as and for the purpose of adjusting the center of the eccentric wheel, as described.

27,500.—Zuriel Swope (assignor to himself, H. D. Musselman and Wm. D. Sprecher), of Lancaster, Pa., for an Improvement in Lamps:

I claim arranging the funnel, E, and pipes, F G and H, with such relation to the wick tube, I, that heat may be taken from the flame and passed down into the lamp under the wick tube, so that the heated oil will rise towards the flame and around the wick, substantially as and for the purpose specified.

27,501.—Halsey D. Walcott (assignor to Martin L. Bradford & Co.), of Boston, Mass., for Improved Scissors and Nippers:

I claim, as a new article of manufacture, a pair of scissors with the points of the blades formed into nippers, substantially as described.

27,502.—Suspended.

27,503.—Franklin W. Willard, of New York City, assignor to himself and E. G. Allen, of Boston, Mass., for an Improvement in Apparatuses for Distilling:

I claim the method described of distilling and evaporating liquids, the same consisting in the employment of a revolving still, provided within its interior with a series of buckets, whereby, while the still is maintained at a uniform temperature, the liquid which is to be acted upon is kept in motion, and portions of the same successively separated, taken up and returned to the mass in thin films, substantially as specified and for the purposes set forth.

27,504.—Daniel H. Wiswell, of Buffalo, N. Y., assignor to Charles W. Adams, of Evans, N. Y., and Debby Pinner, of Buffalo aforesaid, for an Improved Churn:

I claim the inner cover, marked A, of the form described, the scoops or arms, marked B, the sharp edge and slant of the upper part of ribs marked C, combined and arranged as specified, for the purposes set forth.

27,505.—Albert H. Wright (assignor to J. C. Fuller and B. J. Woodward), of Philadelphia, Pa., for an Improved Elastic Chain or Surge Spring for Ship's Cables:

I claim the combined arrangement of the links, A, elastic blocks, B, and swivel bolts, e, the same operating together in the manner and for the purpose specified.

27,506.—S. F. Van Choate, of Yreka, Cal., for an Improvement in Electric Telegraphing:

I claim the employment of a system of connections, substantially as described, connecting the main circuit of one line of electric telegraph and the local circuit of another line in such manner that, by opening the main circuit of one line, the current of its local circuit shall produce an interruption to the current of the main circuit of the other line by repulsive action, as specified.

I also claim the employment of a substantially similar system of connections, operating in a substantially similar manner, to render any electric circuit continuous or interrupted at pleasure by the closing and opening of another and entirely separate circuit.

RE-ISSUES.

Jonas B. Aiken, of Manchester, N. H. (assignee through mesne-assignments of himself and Walter Aiken, of Franklin, N. H.), for an Improvement in Knitting Machines. Patented Sept. 11, 1855:

I claim, first, The use of a hollow circular needle plate, substantially as described, and having grooves in the outer or upper surface for the purpose set forth.

Second, The loop regulator, I, or equivalent thereof, for the purposes and object substantially as described.

Third, The loop regulator, or equivalent thereof, in combination with the needle, and hollow circular needle plate, A, having grooves in the outer or upper surface, as described, the said several parts operating in the manner and for the purposes set forth.

J. McMannus, of New York City, for an Improvement in the Ventilation of Hats. Patented Jan. 3, 1860:

I claim a ventilating piece having a smooth surface next the head and grooves, or openings next the brim, and made of india-rubber, gutta-percha or prepared paper, and firm enough not to crush or close

© 1860 SCIENTIFIC AMERICAN, INC.

up said openings, and impervious to perspiration, as represented, and for the purpose set forth.

Lauriston Towne, of Providence, R. I., for an Improved Chain Machine. Patented Oct. 20, 1857:

I claim, first, The combination of a punch-plunger, or other equivalent instrument, with a forming guide, or its equivalent, substantially as described.

Second, I also claim the combination of a forming guide, or its equivalent, with the instruments co-operating with said guide, or their equivalents, to effect the bending of the arms, substantially as described.

Third, I also claim the combination of a die, j, Fig. 6, or its equivalent, for giving the first bend to the link with a forming guide, or its equivalent, substantially as described.

Fourth, I also claim the combination of a carrier on which the link is transported with a forming guide in which the link is deposited, or their equivalents, substantially as described.

Fifth, I also claim the forming guide for holding and transmitting the chain during the formation thereof, or its equivalent, substantially as described.

Sixth, I also claim giving to the forming guide an angular or intermittent rotary movement upon its axis, so as to present the chain to the successive links in such positions that the arms thereof will alternately interlock.

Seventh, I also claim the slender converging rods, r r, or other equivalent instruments, for holding down the top link while the arms of the link next beneath are being bent over it, substantially as described.

Eighth, I also claim the arrangement and operation of the slides, aa, or their equivalents, substantially as described, so as to bend the arms of each link successively by pairs and cause the succeeding pair or pairs to overlap the preceding ones, or in case the links have an odd number of arms, to cause the succeeding arms of each link to overlap the preceding ones singly in succession.

Philip Ulmer, of New York City, for an Improved Spring Bed Bottom. Patented Oct. 4, 1859:

I claim, first, The method described of connecting the spring, b, or any equivalent means, to the strip, a, by which the same is secured in placed by contact between compressing surfaces, substantially in the manner and for the purposes set forth.

Second, I also claim the use and application of the strip, a, substantially in the manner and for the purpose specified.

D. S. Wagener, of Penn Yan, N. Y., for an Improvement in Flouring Mills. Patented Sept. 25, 1855:

I claim the arrangement of tubes, B and C, connected by the supplemental shoe, K, within the air-tight chamber, A, in the manner described and for the purposes specified.

I claim cleaning grain through a tube or case at the point, K, by means of tube or case, C and K, and blast fan, D, or their equivalent, as set forth.

ADDITIONAL IMPROVEMENTS.

Norman Cowles and Abijah Hulbert, of Edgefield, S. C., for an Improvement in Spring Back Carriage Seats. Patented Oct. 11, 1859:

We claim the upright spring blades, c c, supporting the lazy-back, B, the arm rest springs, D D, when arranged and combined substantially in the manner and for the purposes set forth.

EXTENSIONS.

Solyman Merrick, of Springfield, Mass., for an Improvement in Feeders for Screw Machines. Patented March 7, 1846; re-issued May 7, 1850:

I claim, first, The method, substantially as described, of arranging screw blanks, &c., by the motion of oppositely inclined beveled or curved surfaces with sufficient space between them to receive freely the shanks of the blanks whilst they hang suspended by their heads, the said motion of such surfaces being in the direction of the space between them, substantially as described.

Second, Making one of the said inclined beveled or curved surfaces in two parts, one above the other, substantially in the manner and for the purpose specified.

Third, Combining with the said oppositely inclined beveled or curved surfaces, a fence or guard plate placed across from the one towa ds the other, and over the space in which the blanks are suspended, substantially in the manner and for the purpose specified.

Fourth, In combining with oppositely inclined beveled or curved surfaces revolving arms, wings or heaters, substantially in the manner and for the purpose specified.

Fifth, In combining with the said oppositely inclined beveled or curved surfaces a checking and delivering apparatus, substantially in the manner and for the purpose specified.

Ezra Ripley, of Troy, N. Y., for an Improvement in Tea Kettles. Patented March 14, 1846:

I claim making the spout of tea kettles at its junction with the body to extend from the bulge of the body to within a short distance of the top, whereby, in molding, the spout can be formed by means of a green instead of a dry sand core, as described.

Notes & Queries

J. M. R., of Ohio.—The oil springs are probably the result of the decomposition of vegetable substances by the action of the internal heat of the earth. It is not likely that any of them are absolutely inexhaustable, and their extent will no doubt vary like that of coal beds and other geological deposits.

F. J. H., of D. C.—We saw the boiler and engine of Mr. Frost, while he was alive, in Brooklyn, and witnessed several experiments with his "stame." This is what is now commonly called superheated steam and its being somewhat extensively applied in England.

W. G. C. W., of Mass.—Your case is slowly progressing.

D. R, K., of Conn.—The rock formation of which you speak is by no means of an unusual extent. The whole peninsula of Sweden and Norway is now slowly rising, and the process has been going on for centuries.

W. T. G., of Conn.—The shining substance which you send us is "mica," one of the three constituents of granite. Your stone walls are no doubt full of it, but you have not a placer notwithstanding.

M. A. S., of Ill.—You can gain no power by a siphon. If you have a fall of one foot, and turn over it a siphon which has one leg four feet long, and the other five, the power obtained by the fall of the water through four feet of the longer leg is just expended in drawing the water up through the shorter leg.

J. F., of Md.—If the twist of trees is more apt to turn in a direction corresponding with the course of the sun, it is certainly a very curious fact. Suppose you make a memorandum of the next hundred trees that you split, and see in how many the twist is with the sun.

R. H., of Pa.—You have probably noticed that the statement of a correspondent, that coal tar would keep the curculio off from trees, has been already contradicted.

L. K., of N. Y.—The general rule used for cutting the depth of wheel teeth is to allow .65 of the pitch for the depth. If the space is one inch between two teeth, the depth should be .65 of an inch.

J. C. H., of Tenn.—There is no work in print specially devoted to steam engines and power presses. Catechu is very good for putting into steam boilers to remove incrustations. Slippery elm bark would suit your purpose better than any other substance for the boiler.

A. C. Jr., of Texas.—If you will send us some of the California beer seed we will examine it, and give you our opinion of it.

P. S., of Md.—We like to answer all questions addressed to us, if we can, but really we have not the space to spare for replies to all of yours. They would fill our whole paper. We think that Appleton's Cyclopædia is just the thing for the great mass of intelligent families in this country.

M. & J. H. B. & Co., of N. H.—We hope soon to have a full report of the experiments with turbine wheels at Philadelphia, which we shall lose no time in laying before our readers.

J. A. W., of N. Y.—The breaking weight of different kinds of wood has been found by experiment to be as follows: the sticks, one inch square, extended horizontally with the weight suspended at the end, one foot from the support: oak, 240 lbs.; chestnut, 170; yellow pine; 150; white pine, 135; ash, 175; hickory, 270.

H. L. R., of Texas.—The spinning wheel, for spinning wool by hand, was in universal use by the last generation, and they are very common now in many parts of the country. We presume you can get them made in Texas. The placing of oyster shells in steam boilers to prevent incrustations has been repeatedly suggested.

W. M., of N. Y.—Very manifestly the statement should be: "Water changing into ice converts 140° of latent into sensible heat."

C. H. A., of Mass.—If you mix fine plumbago with india-rubber, you will obtain an article which will have a smooth and hard surface, if a sufficient quantity of it is used. Chalk makes a hard white compound when mixed with india-rubber.

J. S., of N. Y.—The process of rectifying naphtha by distillation is public property—free to you and all. The instructions given on page 350 of our last volume, for purifying coal oil, are suitable to your case, and may be followed with profit.

C. L. C., of Conn.—We believe that a solution of the sulphate of copper (blue vitriol) is better for preserving timber than a mixture of the sulphate of iron (copperas) and copper.

F. F., of Kansas.—You can only obtain works published by order of Congress by applying for them to some of the members. We do not know where you can get "astronomical telescopes at the lowest price." The best telescopes in our observatories have been made to order in Germany.

S. K., of Conn.—A small quantity of the nitrate of silver dissolved in ammonia, and added to your stencil ink, will render it indelible; but it should be kept in a blue-colored dish, or it will be decomposed before it is applied by the action of white light.

D. A. W., of Vt.—The best composition to put on iron gearing as a lubricator when it is exposed to water, to prevent wearing out, is one pound of tallow to the quart of sperm oil, and one ounce of fine plumbago carefully stirred in when the tallow and oil are warm. Oak is the most durable timber for the sills of mills. If you char the surface of the wood by burning it slightly, it will endure much longer, either above or below water. An application of hot pitch to the surface of such wood also renders it more durable.

J. P. A., of Ohio.—A good lacquer is made by coloring lac-varnish with turmeric and annato. Add as much of these two coloring substances to the varnish as will give it the proper color; then squeeze the varnish through a cotton cloth, when it forms lacquer. You can obtain bronze powders in any store where artists' materials are sold. With any proper varnish, you can bronze lamps with such colored bronze powders as may suit your taste.

G. B., of N. Y.—Perhaps the reason of our misunderstanding you is to be found in the peculiar manner in which you use the word "ponderable." As ordinarily understood, carbon is just as ponderable when floating in the air as when concentrated in woody fiber or charcoal. The position of yours which we pronounced unsound, was that vegetable life converts imponderable into ponderable substances.

T. S. P., of Ill.—The experiment has been tried of melting quartz to extract the gold. One trader in this city was included to purchase the secret of a flux, and to fit out quite an expedition to California to put it in practice. After he got there, he was surprised to find how great a heat was required to melt the quartz; and the first intelligent man that he fell in with told him that no doubt the flux which he was keeping so private was potash. The plan takes too much fuel to be profitable.

E. T. Q., of N. H.—Certainly our answers are open to criticism. Of course, writing for so many readers and making a business of it, we use every means in our power to make our statements correct, but none but a perfect ass will pretend to be infallible. If we make a false assertion we are more anxious than any one else can be to have it promptly and unequivocally corrected, and we thank you for calling our attention to the answers which you speak of. The one in regard to the mirror was made in reference to our understanding of the question, which you will find fully explained elsewhere. In regard to the velocities of falling bodies: Suppose that there were but two bodies in the universe—the earth and a pebble the size of an egg—and that they were 95,000,000 of miles apart in a state of rest when the force of gravitation commenced its action upon them, they would fall toward each other, meeting at their common center of gravity (Newton's Principia, law iii., cor. 4). Now, suppose again but two bodies—the earth and the sun—meeting also at their common center of gravity. Would not the pebble move with greater velocity than the sun?

J. H. M., of N. Y.—Numerous correspondents have entirely settled the question in regard to cracks in frozen mud. They run in all directions, and "Medicus" was in error.

G. E. S., of Mass.—The plan of forcing up water into an elevated reservoir and then using the head to throw the water over buildings in case of fire, has been long in use. The city of Worcester has such a water supply, though we believe the reservoir is supplied by natural sources from the hills and requires no power to raise it.

J. C. W., of Ohio.—Water colors are used for colcring maps. They are applied with a brush, and when done in large establishments, generally through stencil plates.

E. H. C., of Mass.—A horse will draw a larger load up hill if the wheels of the wagon run on iron rails than if they run on a good hard road.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, March 17, 1860:—

A. W., of Conn., $30; F. Y. C., of Ga., $30; E. T. W., of Ind., $30. I. C., of Iowa, $30; H. N. & J. C. B., of Conn., $25; S. F. J., of Ind., $30; T. & W., of N. Y., $25; J. M., Jr., of Ill., $30; B. & McC., of Iowa, $30; I. R. S., of Va., $30; G. T., of U. C., $25; E. P. G., of Iowa, $28; G. D., of Ill., $30; D. S. H., of Mich., $10; J. & S., of R. I., $30; G. E. H., of N. Y., $30; W. F. J., of Ala., $100; W. A. B., of Texas, $30; S. R. G., of N. Y., $20; A. H., of Conn., $30; K. C. K., of N. Y., $25; J. T. F., of Ky., $25; S. & P., of Mich., $30; C. E. H., of Mass., $25; S. & S., of Vt., $30; W. G., of Ohio, $25; W. J. J., of Ala., $20; J. B. J., of N. Y., $30; J. O. C., of Conn., $25; W. H. S., of Conn., $35; A. S., of N. J., $20; S. & M., of N. Y., $25; T. B. L., of Mich., $30; J. W., of Iowa, $60; G. A. N., of N. Y., $150; F. F., of N. Y., $25; A. & W., of N. Y., $25; H. & W., of Ohio, $10; H. S., of R. I., $25; W. F., of Mich., $25; S. L. A., of N. Y., $30; C. M. D., of Conn., $30; J. S., of N. Y., $25; E. B., of Conn., $58; N. H. H., of Wis., $25; H. & P., of N. Y., $150; O. Z. P., of N. Y., $25; G. M., of Conn., $25; F. F. S., of Ill., $12; L. H., of N. Y., $30; H. Van S. & Co., of N. Y., $58; J. H. I., of Ill., $30; H. G. S., of Iowa, $25; B. & L., of N. Y., $25; J. B., of Del., $25; G. & B., of Conn., $20; B. S., of Va., $25; J. H., Jr., of N. J., $25; O. Z. P., of Conn., $30; W. P. F., of Conn., $30; J. J., of Ill., $30; G. W., of Pa., $30; T. H. G., of Wis., $25; F. G. & E. A. F., of Ill., $30; W. W. H., of N. Y., $30; F. B. L., of N. Y., $25; J. M., of Ill., $25; W. S., of N. Y., $30; H. B., of N. Y., $30; E. H. B., of N. Y., $25; J. H. L., of N. Y., $25.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, March 17, 1860:—

F. Y. C., of Ga.; G. M., of Conn.; J. O. C., of Conn.; M. E. T., of N. Y.; B. S., of Va.; J. L., of N. J.; T. H. G., of Wis.; W. F., of Mich.; F. B. L., of N. Y.; J. E. A., of Tenn.; J. M., of Ill.; N. H. H., of Wis.; C. E. H., of Mass.; J. H., Jr., of N. J.; G. M., of Conn.; W. G., of Ohio; H. G. S., of Iowa; B. & L., of N. Y.; S. & M., of N. Y.; T. & W., of N. Y.; J. M., of Ill.; E. P. G., of Iowa; K. C. K., of N. Y.; E. B., of Conn.; E. H. B., of N. Y.; J. T. F., of Ky.; S. & S., of Vt.; H. N. & J. C. B., of Conn.; M. A. H., Jr., of Ill.; W. H. S., of Conn.; J. B., of Del.; T. B. L., of Mich.; H. S. of R. I.; H. A. J., of Mo.; A. & W., of N. Y.; D. S. H., of Ill.; J. H. L., of N. Y.; W. M. B., of Ind.; O. Z. P., of Conn.

HINTS TO OUR READERS.

To New Subscribers.—Back numbers to commence the volume.—As most subscribers to this paper desire the back numbers to render their volumes complete for binding, we shall continue to send the back numbers to January 1st (the commencement of Vol. II, new series), unless the person ordering the paper instructs us to the contrary, at the time of making the remittance. Should the person sending for the paper desire his subscription to commence at the time he makes his remittance, or at any other period, he can be accommodated, as we are constantly re-printing back numbers from our electrotype plates, and can supply as many of any number as may be desired, up to a million of copies; in fact we have printed over 70,000 copies of a single number—such has been the demand for back numbers.

Bound Volume I.—Covers for Binding, &c.—New subscribers who may desire the first volume of the New Series which contains the numbers from July 1, 1859, to January 1, 1860, can be supplied with it by mail or express, handsomely bound, in cloth, at the following prices:—At the office of publication, or by express, $1.50; by mail (which includes postage), $2; in sheets, complete, $1. Covers may also be had separately, which answer as portfolios for preserving the papers, or for binding. Price for covers at the office, or delivered by express, 40 cents; by mail (including postage), 50 cents. For the same investment no work containing so much valuable information can be obtained as is contained in one volume of the Scientific American. Orders should be addressed to MUNN & CO., 37 Park-row, New York. Bound volumes may also be had of most all the periodical dealers throughout the country.

AGENTS SELL PROFITABLY "THE DOLLAR Copying Press" (book detached), saving press-buyers several dollars. Send for circular. J. H. ATWATER,
13 1* Providence, R. I., Introductory and Patent Agent.

5.000 AGENTS WANTED—TO SELL FOUR new Inventions. Agents have made $25,000 on one; better than all other similar agencies. Send four stamps, and get 80 pages of particulars, gratis. EPHRAIM BROWN,
13 13* Lowell, Mass.

BURNELL'S PATENT ROTARY PUMP—adapted to all purposes of pumping, from the well and cistern to the steam fire-engine. The most simple, durable and efficient pump yet made. Principal sales depot at No. 23 Platt-street, New York. [13 13*] SAMUEL B. LEACH.

AN ACTIVE MAN, HAVING BEEN FIVE years in the sale of Patent articles, is desirous of finding something that will sell. Those having such will find a cash customer by addressing YANKEE, box 213 Chicago, Ill. 13 1*

SECOND-HAND STEAM ENGINES AND BOILers for Sale.—One horizontal engine, about 8-horse power; one vertical engine and boiler, about 12-horse power. Both as good as new, and will be sold low. Apply to R. HOE & CO., Nos. 29 and 31 Gold-street, this city. 13 2

© 1860 SCIENTIFIC AMERICAN, INC.

IMPORTANT TO INVENTORS.

THE GREAT AMERICAN AND FOREIGN PATENT AGENCY.—Messrs. MUNN & CO., Proprietors of the SCIENTIFIC AMERICAN, are happy to announce the engagement of HON. JUDGE MASON, formerly Commissioner of Patents, as associate counsel with them in the prosecution of their extensive patent business. This connection renders their facilities still more ample than they have ever previously been for procuring Letters Patent, and attending to the various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c., &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, extending over a period of fourteen years, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

Consultation may be had with the firm, between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH-STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Office, are cordially invited to call at their office.

They are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business they have Offices at Nos. 66 Chancery Lane, London; 29 Boulevard St. Martin, Paris, and 26 Rue des Eperonniers, Brussels. We think we may safely say that three-fourths of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

A pamphlet of information concerning the proper course to be pursued in obtaining Patents through their Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office or either of the Branches. They also furnish a Circular of information about Foreign Patents.

The annexed letters from the last three Commissioners of Patents we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE came through your hands. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant; J. HOLT.

Messrs. MUNN & Co.—Gentlemen: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

Communications and remittances should be addressed to

MUNN & CO.
Publishers, No. 37 Park-row, New York.

FOR $650 I WILL SELL ALL THE MACHINery, complete, to manufacture round splint matches.
13 1* F. F. BELLINGER, Mohawk, N. Y.

ART OF MATCH-MAKING.—WILL SELL RECipes, with full directions, equal to the best imported fancy matches, without sulphur. L. BELLINGER,
13 1* Mohawk, N. Y.

PORTABLE STEAM ENGINES—6, 8 AND 10-horse, at $500, $625 and $780. For sale by S. C. HILLS, No. 12 Platt-street, New York. 13 e3w

---

NEW INVENTIONS IN THE STATIONERY OR Hardware line wanted (patented or not patented), by a cash purchaser. Address, with particulars, WM. BURNET, Station D, New York City. 13 1*

PATENTED WOOD-BENDERS FOR ALL VArieties of heavy or light Bent Wood. Builders, Lane & Bodley. Patentee, JOHN C. MORRIS, Cincinnati, Ohio. 13 3*

COPE'S PATENTED COAL OIL PUMP—RELIable and effective. Manufactured by S. CUMMINGS & SON, No. 162 Front-street, Cincinnati, Ohio. 13 3*

A. WORTH'S SELF-ACTING WOOD-TURNING Lathe does the work of four or five hands, in a perfect manner, when operated by a boy. Wm. J. Stevens' Patent Direct-acting Lift, Force and Fire Pump, the most reliable made; works under all pressures of steam. Also, superior Machinists' Tools, of every description, manufactured by CARPENTER & PLASS, No. 479 First-avenue, New York. 13 3*

FOR SALE—FOR WANT OF WORK, ONE Steam Engine, 12-inch cylinder, boiler, heater, pump, &c., complete; two 6-rolls 14-inch Woodworth's Planer and Matching Machine; one heavy 6-rolls 22-inch Planer; one 4-rolls (iron frame) 22-inch Planer; one Daniels' Planer, 20 feet long by 2 feet wide—patent feed; a full set of machines for manufacturing Sash, Blinds, Doors, Moldings, Turning and Scroll Sawing, &c., with Shafting, Hangers, Pulleys and Belting; all new last year, and but little used. Inquire of PELEG CLARK, Sr., Fredericksburg, Va. 13 2*

WOODWORTH PLANING MACHINES—ON hand and in course of construction, at less prices than ever before offered. Address J. H. LESTER, No. 57 Pearl-street, Brooklyn, N. Y. 13

STEAM HAMMERS.—THE UNDERSIGNED, makers of the celebrated Nasmyth hammers, having a full assortment of patterns, continue to furnish them at reduced prices, and of any size, from 5 cwt. upwards. The large number hitherto made by them, and in successful operation, precludes the necessity of presenting any recommendations. They are also patentees and exclusive makers, for this country, of what is generally known as the "Condie," or inverted hammer, one of which of six tuns, falling six feet, has been in operation at the Franklin Forge, New York, since 1849. [23 eowtf] MERRICK & SONS, Philadelphia.

MACHINE BELTING, STEAM PACKING, ENGINE HOSE.—The superiority of these articles, manufactured of vulcanized rubber, is established. Every belt will be warranted superior to leather, at one-third less price. The Steam Packing is made in every variety, and warranted to stand 300 degs. of heat. The Hose never needs oiling, and is warranted to stand any required pressure; together with all varieties of rubber adapted to mechanical purposes. Directions, prices, &c., can be obtained by mail or otherwise at our warehouse. NEW YORK BELTING AND PACKING COMPANY. JOHN H. CHEEVER, Treasurer,
1 13 Nos. 37 and 38 Park-row, New York.

BOILER FLUES FROM 1 1-4 INCH TO 7 INCHes outside diameter, cut to any length desired, promptly furnished by JAMES O. MORSE & CO.,
1 tf No. 76 John-street, New York.

PLASTIC CARBON FILTERS—THE MOST simple, effective and reliable means of purifying water without trouble or loss of time; may be used for all domestic and manufacturing purposes, and will be furnished in various sizes, by A. G. SCHELLER, No. 36 Beekman-street, New York. 11 3*

SITUATION WANTED—BY AN ENGINEER and draughtsman, with several years' experience in designing and constructing stationary steam engines, tan-burning boilers, mill machinery, &c. Best reference, &c. G. W., York, Pa.
9 5*

WATER WHEELS.—SMITH'S AMERICAN Turbine (patented June, 1859); superior to any wheel now in use. Those desiring wheels, or to purchase rights in any part of the United States, can do so by addressing the subscriber and patentee.
11 3* JONAS SMITH, Westport, Conn.

THE AMERICAN PUMP.—THIS VALUABLE invention has now been in operation one year, and gives universal satisfaction. Drawings and prices sent free. Patent rights, and rights to sell in limited territory, for sale on good terms. Address JAMES M. EDNEY, No. 147 Chambers-street, New York.
11 tf

SOLID EMERY VULCANITE.—WE ARE NOW manufacturing wheels of this remarkable substance for cutting, grinding and polishing metals, that will outwear hundreds of the kind commonly used, and will do a much greater amount of work in the same time, and more efficiently. All interested can see them in operation at our warehouse, or circulars describing them will be furnished by mail.

NEW YORK BELTING AND PACKING CO.,
9 tf Nos. 37 and 38 Park-row, New York.

$1200 A YEAR MADE BY ANY ONE WITH $10.—Stencil tools; silver medal awarded. Samples free. Address A. J. FULLAM, Springfield, Vt. 7 6eow*

GUILD & GARRISON'S STEAM PUMPS FOR all kinds of independent Steam Pumping, for sale at 55 and 57 First-street, Williamsburgh, L. I., and 74 Beekman-street, New York.
1 13 GUILD, GARRISON & CO.

IRON PLANERS, ENGINE LATHES, AND OTHER Machinists' Tools, of superior quality, on hand and finishing, and for sale low; also Harrison's Grain Mills. For descriptive circular, address New Haven Manufacturing Co., New Haven, Conn. 1 13

SCIENTIFIC AMERICAN.—VOL. I. WANTED. Vol. III. for sale; price $3, unbound.
12 2* C. A. SHAW, Biddeford, Maine.

STEAM AND VACUUM GAGES—WATER gages and tubes, self-cleaning gage cocks, signal gongs for locomotives and steamboats, Ashcroft's low water detector, indicators, steam whistles, &c. E. BROWN, No. 311 Walnut-street, Philadelphia. 12 2*

MACHINISTS' TOOLS FOR SALE.—ONE BOLTcutting machine, with taps and dies up to 1¼ inch diameter. Planing machines—One planes 30 feet long, 5 feet 2 inches wide, and 5 feet 2 inches high; weight about 24 tuns. Two do. (Wilmarth's pattern) planes 16 feet long, 3 feet 6 inches wide and 3 feet 5 inches high. One do. (Mason's pattern) planes 6 feet long, 31 inches wide and 35 inches high. Slide lathes—one 16 feet long and turns 36 inches diameter; one do. 15 feet long, and turns 20 inches diameter; one do. 12 feet long, and turns 25 inches diameter; one do. 6 feet long, and turns 16 inches diameter. The above lathes are all back-geared and screw-cutting, with counter shafts and pulleys complete. One hand lathe 8 feet long, turns 15 inches diameter; back-geared, with counter shafts, &c. One small boring mill and two shop cranes complete. All the above machines are first class and in perfect order. Apply to CHARLES W. COPELAND, No. 122 Broadway, New York.
8 4eow

INSTRUMENTS.—CATALOGUE (6TH EDITION), containing over 250 illustrations of Mathematical, Optical and Philosophical Instruments, with attachment of a large sheet representing the Swiss Instruments in their actual size and shape, will be delivered, on application, to all parts of the United States, by sending 12 cents in postage stamps. C. T. AMSLER,
635 Chestnut-street, Philadelphia.

Catalogues, without the large sheet of Swiss Instruments, furnished gratis, on application. 2 6eow*

A VALUABLE PATENT.—WE HAVE A PATent for sale which we can with confidence recommend to the public as worthy of an examination and investment. Needed in every house in the United States; but small amount of capital to bring it before the public. Apply at the Inventors' Exchange, No. 37 Park-row. S. A. HEATH & CO. 12 4*

PATENTS.—WANTED, PATENT AGENTS, OR others, to sell several valuable patent rights west of the Rocky Mountains. Address box 187, Harrisburg, Pa. 12 3*

WHEELER & WILSON'S SEWING MACHINE. "They have no rival."—Scientific American. Office, No. 505 Broadway, New York. Send for a circular. 4 tf

---

GRAY & WOODS' PATENT IMPROVED Planer; a combination of the Woodworth and Daniels' planers, particularly adapted for shop work, and for which we have obtained three patents and six medals. (See description and illustration in No. 6, present volume, SCIENTIFIC AMERICAN.) Also for sale, all kinds of wood-working machinery. Send for a circular. Address GRAY & WOODS, No. 69 Sudbury-street, Boston, Mass. 11 5*

Zur Beachtung für Erfinder.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu adressiren an

Munn & Co.,
37 Park Row, New-York.

Auf der Office wird deutsch gesprochen.

OIL! OIL! OIL!—FOR RAILROADS, STEAMers, and for Machinery and Burning. Pease's Improved Machinery and Burning Oil will save fifty per cent., and will not gum. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The SCIENTIFIC AMERICAN, after several tests, pronounces it "superior to any other they have ever used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE,
No. 61 Main-street, Buffalo, N. Y.

N. B.—Reliable orders filled for any part of the United States and Europe. 1 13

THE "STEAM ENGINE"—HAND-BOOK FOR locomotive engineers; by Septimus Morris. Illustrated, 12mo., $1.50. The "Locomotive Engine;" by Zerah Colburn. Illustrated, 75 cents. "Practical Examination on Steam and the Steam Engine;" by William Templeton. 12mo., 75 cents; by mail, free of postage.
HENRY CAREY BAIRD, Publisher of practical books,
11 3 Philadelphia, Pa.

MAPES' AGRICULTURAL IMPLEMENT AND Seed Warehouse, Wholesale and Retail. All improved and standard varieties of Agricultural Machinery and Implements. Orders from correspondents promptly attended to, and special attention given to low contracts for freight. CHARLES V. MAPES,
24 tf 128 and 130 Nassau and 11 Beekman-streets, New York.

W. M. WHITTEMORE (SUCCESSOR TO John Whittemore & Co.), No. 91 Maiden-lane, New York, Commission Merchant and dealer in Cotton and Woolen Machinery and manufacturers' supplies. 4 13*

PAGE'S LIME AND CEMENT KILN (PATENTS 1854-57-58)—Burns 160 bbls. with 2½ cords of wood or one tun of anthracite coal, not mixed with the stone; will also burn rock marl or shell. Rights for sale by C. D. PAGE, patentee, Rochester, N. Y. 7 10*

CHARLES W. COPELAND, CONSULTING AND Superintending Engineer, No. 122 Broadway, New York, Plans and specifications prepared. Steam vessels and steam engines, both new and second-hand, for sale. Also, wire rope, steam and water gages, indicators, &c., &c. 1 13*

APPEALS BEFORE THE JUDGES OF THE U. S. District Court, from the final decisions of the Patent Office, in Rejected Cases, Interferences, &c., are prosecuted by the undersigned on moderate terms.

MUNN & CO., Solicitors of Patents,
No. 37 Park-row (Scientific American Office), New York.

VALUABLE MACHINERY—TO GUN MANUfacturers and others; Hartford, Conn.—To be sold, by private sale, until the end of March, unless sooner disposed of, the following valuable machinery, late in use by Messrs. Robbins & Lawrence for the manufacture of Minie rifle barrels (Enfield pattern), under contract with the British government, viz.: one steam engine, 40 horse-power; 14 trip-hammers, 26 milling machines, 12 rifling machines, together with a proportionate number of lathes, power and hand; reaming, boring and polishing machines; machines for other purposes, and drill and power presses. A set of tools and cutters, adapted to the above manufacture, belongs to each machine. For sale, likewise, a large assortment of tools for general purposes. The above machinery is in excellent order, and much of it adaptable for general manufacturing purposes. May be seen at the Sharp's Rifle Manufactory, Hartford, on application to Mr. LAWRENCE, on the premises. A catalogue is being prepared. For particulars, apply to R. S. Lawrence, Esq., as above; John Hooker, Esq., State Bank Building, Hartford; or Henry Whittaker, Esq., No. 11 Wall-street, New York.
7 8*

PLANT & BROTHER, NO. 14 NORTH MAINstreet, St. Louis, Mo., dealers in seeds and agricultural implements; also agents for the sale of iron and wood-working machinery, pumps, scales, engines, belting, hose and manufacturer's supplies.
10 12*

NEW SHINGLE MACHINE—THAT WILL RIVE and Shave 24,000 Shingles in a day, for sale by
10 tf S. C. HILLS, No. 12 Platt-street, New York.

PATENT MACHINERY AGENCY.—PATENTS and articles purchased and sold on commission. THOMAS J. SPEAR & CO., box S 137, or 177 Canal-street, New Orleans, La.
9 11*

WROUGHT IRON PIPE, FROM ONE-EIGHTH of an inch to six inches bore; Galvanized Iron Pipe, (a substitute for lead,) Steam Whistles, Stop Valves and Cocks, and a great variety of Fittings and Fixtures for Steam, Gas, and Water, sold at wholesale and retail. Store and Manufactory, No. 76 John-street, and Nos. 29, 31 and 33 Platt-street, New York.
1tf JAMES O. MORSE & CO.

C. L. GODDARD, AGENT, NO. 3 BOWLING Green, New York. Only Manufacturer of the Steel Ring and and Solid Packing Burring Machines and Feed Rolls for Wool Cards, &c. 4 12*

---

500 AGENTS WANTED—TO ENGAGE IN AN honorable business, which pays from $3 to $6 per day. For particulars, address M. M. SANBORN, Brasher Falls, N. Y.
11 3*

PECK'S PATENT DROP PRESS IS THE MOST perfect machine in use for the manufacture of copper, brass or tin-ware, jewelry, spoons, &c.; and for the purpose of forging (with dies), it is superior to any other machine yet invented. All sizes of the above machines on hand or made to order, on short notice, by the patentee, MILO PECK & CO., New Haven, Conn. 7 13*

WOODWORTH PLANERS—IRON FRAMES TO plane 18 to 24 inches wide, at $90 to $110. For sale by S. C. HILLS, No. 12 Platt-street, New York. 1 tf

---

THE FOLLOWING VILLAGE GAS-WORKS ARE now erecting under the Aubin system, viz.:—For the city of San Antonio, Texas; for the villages of Bath, N. Y.: Plattsburgh, N. Y.; Gloversville, N. Y. (changed from rosin works); Rutland, Vt.; Dover, Del.; Jersey Shore, Pa.; Flemington, N. J.: Greensboro, N. C.; and Point Levi, Canada. For reference to the Aubin village works erected last year and this spring, where both consumers and stockholders are satisfied, apply to the Aubin Company, No. 44 State street, Albany, N. Y. 1 13

A MESSIEURS LES INVENTEURS—AVIS IMportant.—Les inventeurs non familiers avec la langue Anglaise, et qui prefereraient nous communiquer leurs inventions en Francais, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence.

MUNN & CO., Scientific American Office, No. 37 Park-row, New York.

© 1860 SCIENTIFIC AMERICAN, INC.

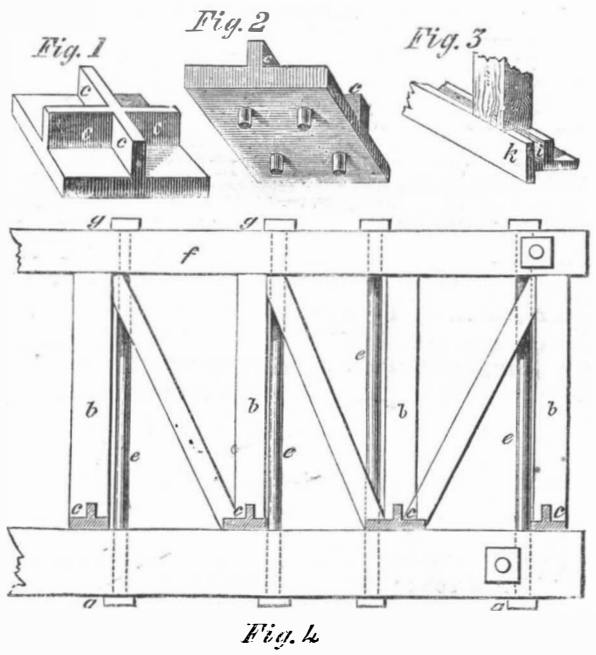
BILLINGS' IMPROVEMENT IN FREIGHT CARS.

On the first of January last there were 29,401 miles of railroad in operation in the United States. What the number of freight cars is on all these roads we have no means of knowing, but it must be immense, and the invention which we here illustrate claims to increase the durability of all freight cars on railroads to which it may be applied, some five or six years beyond the time which they last under the present mode of construction. As cars are made of a considerable length and supported on axles near their ends, it is necessary to strengthen them by a series of truss work on each side, and in the present plan, the upright studs of the truss are mortised into the lower plate or sill. This form of joint causes moisture to collect, and the tenon of the stud soon rots away, thus destroying the whole fabric by the decay of a very small portion, while most of the parts are sound.

This invention consists in a mode of fastening the lower end of the stud to the sill by means of an iron shoe, in such a manner that moisture is not retained, and the rot is consequently avoided. This shoe is represented clearly in Fig. 1, the upright plates, *c c c c*, entering vertical mortises in the end of the stud. The sill and upper plate are held together by the vertical rods, *e e e*, which pass through them and are secured by the nuts or heads, *g g g g*, upon the ends of the rods. The shoe is provided with pins upon its lower side as represented in Fig. 2, which enter holes in the sill. This is the mode of constructing cars which are open at the sides.

For cars which are "closed in," the shoe is made long as represented in Fig. 3, with a continuous groove, *i*, to receive the lower ends of the planks of which the side of the car is formed; this shoe being bolted to the sill and having the guard plate, *k*, projecting downward partly over the side of the sill. The upper ends of the planks fit into a groove in the upper beam, *f*, and when the planks have been slipped into these grooves they are held in place by a horizontal screw brace which passes across the upper part of the door of the car, thus rendering the construction of the car easy and simple.

The patent for this invention was procured through the Scientific American Patent Agency, May 31, 1859, and further information in relation to it may be obtained by addressing the inventor, Joseph D. Billings, at Rutland, Vt.



BILLINGS' IMPROVEMENT IN FREIGHT CARS.

CITY BOILER INSPECTION.

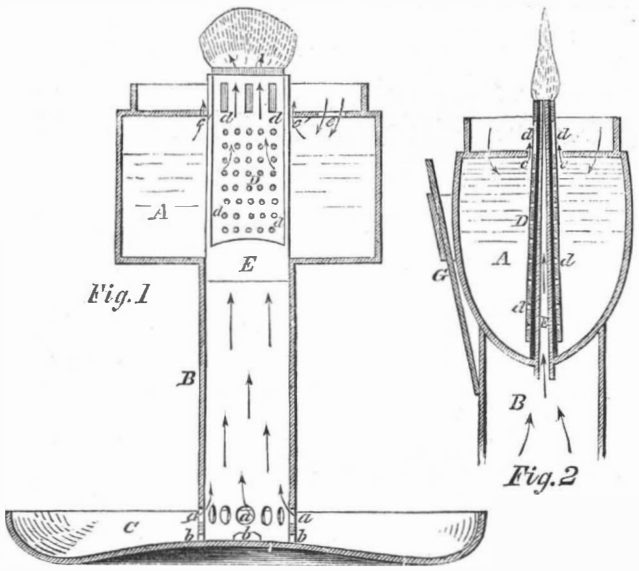
A bill is now before the Assembly, providing for the inspection of steam boilers and engines, and their appurtenances, and regulating the use of the same in New York and Brooklyn. The comptroller of each city is authorized to appoint competent steam engineers, who shall not be interested directly or indirectly in the manufacture or sale of any article relating to steam, and without whose inspection no boiler shall be hereafter erected in either city. The inspectors are authorized to license competent engineers, and every steam boiler in the respective cities must be examined once in every six months; and failure to have an examination renders parties liable for $20 fine for every day such failure continues; and any engineer acting without being licensed is liable himself, as well as the parties employing him, to $20 fine for each day he is so employed. The inspectors are authorized to employ an assistant, and with the comptroller's concurrence, all necessary clerks, whose salaries are to be paid out of fees for inspection, which are fixed as follows:—

Engine and boiler of	10	horse-power.....	$3
" " "	30	"	5
" " "	50	"	8
" " " over	50	"	10

besides all necessary expenses incurred in such examinations. Fines recovered under this act go to the benefit of the Fire Department Widows and Orphans' Fund. This is a good bill, and we hope it will pass, nevertheless we do not expect it will be the means of entirely preventing further explosions. It will no doubt tend to prevent some that otherwise might take place, but our very best laws are so feebly executed that we do not expect better of this one. Political partizans may be appointed inspectors not on account of their mechanical and scientific ability, but their influence at the elections. At least, this is the custom with almost all our government offices.

VON BONHORST'S EXCELSIOR LARD LAMP.

It is only by traveling through the vast agricultural districts of the country that one can realize the immense extent to which lard is used for illuminating purposes. The simplest form of lamp is a saucer with a cloth laid in the edge of it for a wick, and there are thousands of families who use no other. But the genius of the inventor has invaded this department, and the sciences of chemistry and natural philosophy are called to aid in perfecting this humble but important utensil. The accompanying engravings represent a lard lamp in which the flame is supplied with an internal and an external current of air, as in the best oil lamps.



THE EXCELSIOR LARD LAMP.

There are two wicks, contained in flattened tubes, D D, of which the side is represented in Fig. 1, and the edges in Fig. 2. The lard is contained in the chamber, A, and soaks into the wicks through the openings, *d d a d*, in the sides of the tubes, D D. The pillar, B, is made hollow, with openings, *a a*, near the bottom, for the admission of air, and other openings, *b b*, quite at the bottom, for the escape of the melted lard which may flow over into the hollow pillar in case the lamp should be placed upon a stove or in any other very warm position. Between the wick tubes, D D, is a flattened air tube, E, which opens into the hollow pillar, B, and conducts a current of air between the upper ends of the wicks, thus furnishing a constant supply of oxygen to the inner sides of the two flames. At the same time currents of air are brought against the outer sides of the flames by means of the openings, *e* and *c'*, through the upper part of the lard chamber, which cause a flow of air in the direction of the arrows. This internal and external supply of oxygen causes a very perfect combustion, entirely preventing the escape of smoke, as has been shown to us by occular demonstration.

The wick tubes, as well as the air tube, E, are made tapering, contracting towards the top, and the wicks are inserted by means of the little implement, G, which is kept in a receptacle at the side of the lamp, to be convenient for this purpose.

The patent for this invention was obtained, Feb. 21, 1860, through the Scientific American Patent Agency, and persons desiring further information in relation to it will please address the inventor, Charles Von Bonhorst, at Hancock, Md.

THE FIRE ANNIHILATOR ON A "BURST."—One of four Phillips' fire annihilators, stored in a small room on the scond floor of the building, Nos. 26 and 28 Frankfort-street, this city (occupied by E. O. Jenkins as a printing-office), exploded on the 13th inst., causing an alarm of fire, and producing great consternation among the employes, many of whom were females. The firemen soon put out the fire, which had caught in a pile of paper. Mr. Jenkins says that, just before the explosion occurred, he observed a vapor, accompanied by a hissing sound, escaping from the room in question, and believing that the steam boiler was about to explode, he ran into the street; his foreman, however, ascertained the origin of the fire, and threw the annihilators out of the window. The explosion is supposed to have resulted from the spontaneous combustion of the materials of which the annihilator was composed.

RAILROAD BUSINESS.—The railroads are improving in business. The earnings of the Hudson River Railroad for February, 1860, were $209,422; for the same month last year, $190,588—an increase of $18,834.

MECHANICS, INVENTORS, MILLWRIGHTS, AND MANUFACTURERS.

The SCIENTIFIC AMERICAN is a paper peculiarly adapted to all persons engaged in these pursuits, while to the Farmer, Housekeeper, and Man-of-Science, it will be found of equal interest and use.

The SCIENTIFIC AMERICAN has been published FOURTEEN YEARS, and has the largest circulation of any journal of its class in the world. It is indispensable to the Inventor and Patentee; each number containing a complete official list of the claims of all the patents issued each week at the United States Patent Office, besides elaborate notices of the most important inventions, many of which are accompanied with engravings executed in the highest degree of perfection.

To the Mechanic and Manufacturer the SCIENTIFIC AMERICAN is important, as every number treats of matters pertaining to their business, and as often as may be deemed necessary a column or two on the metal and lumber markets will be given; thus comprising, in a useful, practical, scientific paper a Price Current which can be relied upon.

The SCIENTIFIC AMERICAN is published weekly in a form suitable for binding, each number containing sixteen pages of letter-press, with numerous illustrations, making a yearly volume of 832 pages of useful matter not contained in any other paper.

Terms.

To mail subscribers: Two Dollars a Year, or One Dollar for Six Months. One Dollar pays for one complete volume of 416 pages; two volumes comprise one year. The volumes commence on the first of JANUARY and JULY.

Club Rates.

Five Copies, for Six Months	$4
Ten Copies, for Six Months	$8
Ten Copies, for Twelve Months	$15
Fifteen Copies, for Twelve Months	$22
Twenty Copies, for Twelve Months	$28

For all clubs of Twenty and over, the yearly subscription is only $1 40. Names can be sent in at different times and from different Post-offices. Specimen copies will be sent gratis to any part of the country.

Southern, Western, and Canadian money or Post-office stamps taken at par for subscriptions. Canadian subscribers will please to remit twenty-six cents extra on each year's subscription to pre-pay postage.

When persons order the SCIENTIFIC AMERICAN they should be careful to give the name of the Post-office, County, and State to which they wish the paper sent. And when they change their residence, and wish their paper changed accordingly, they should state the name of the Post-office where they have been receiving it, and the where they wish it sent in future.

MUNN & CO.
Publishers, No. 37 Park-row, New York.

© 1860 SCIENTIFIC AMERICAN, INC.